WOOD TANKS

CATALOG Nº 37

NATIONAL TANK & PIPE CO.

Division of M and M Wood Working Co.

KENTON STATION • PORTLAND, OREGON

24.48
10
244.80
49
293.80

41.80
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418.00
3
1254.00

51.67
10
516.70
3
1550.10
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1843.90

24.48
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734.40

Catalog No. 37

"National Quality"

WOOD TANKS

INCLUDING

MINING AND CHEMICAL TANKS

AND

CYANIDE PLANTS

PRODUCTS

NATIONAL TANK & PIPE COMPANY

DIVISION OF M AND M WOOD WORKING COMPANY

One of the world's largest manufacturers
of Tanks, Cyanide Plants, Pipe,
Flume, Silos, and Crossarms.

2301 NORTH COLUMBIA BOULEVARD

PORTLAND, OREGON

CABLE ADDRESS:
"NATANKPIPE"

CODES USED:
BENTLEY'S WESTERN UNION A B C
PRIVATE—SEE INDEX

PRINTED IN U.S.A.

Home office building of National Tank & Pipe Co., Kenton Station, Portland, Oregon. This company is one of the largest wood tank and wood pipe manufacturers in the world.

Technical Service

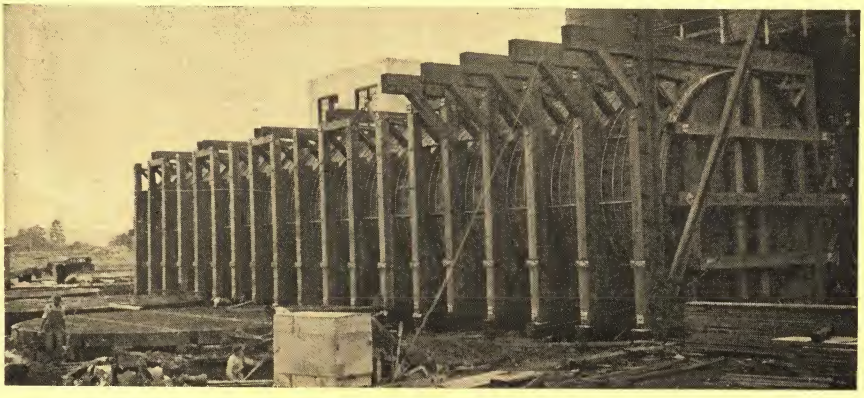
It is the desire and policy of this company to assist its customers in obtaining maximum value in the purchase of Wood Tanks and the best possible results from the use of those Tanks. To these purposes the pages of this book are dedicated.

We particularly call attention to the services you may obtain from our Engineering Department. Unusual questions and problems relating to Wood Tanks and other equipment in our line may confront you. Whenever this happens, please get in touch with us. Let our Engineering Department have all of the facts about your problem, and it will help you to a speedy solution.

Our organization has for over forty years been engaged in the manufacture of Wood Tanks and Wood Pipe. The information herein assembled has been accumulated through practical observation and experience over that long period.

The pages that follow contain information that is intended to be of value to those who design, erect, and use Wood Tanks.

We wish to assure our old customers that we stand ready to serve them in the future as we have done in the past. We urge new customers to give us a chance to prove that we can solve Wood Tank problems and help them get more real value for the money they spend.



"National Quality" Horizontal Tank 20 feet inside diameter by 120 feet long inside

Port of Portland

Shipping Facilities

Shipment may be made over any of the following railroads:

Union Pacific Railroad Company
Spokane, Portland & Seattle Railway Company
Great Northern Railway Company
Northern Pacific Railroad Company
Chicago, Milwaukee, St. Paul & Pacific Railroad Company
Southern Pacific Company

Export trade is handled through numerous Steamship Companies operating to all portions of the world with direct sailings from Portland. All materials for steamer shipment must be crated and strapped to avoid damage.

Instructions for Ordering

In selecting the best and most durable tanks for your needs, please be assured that it is only necessary to specify "*National Quality*" *Tanks*. The specifications set forth in this book assure you of tanks as nearly perfect as any manufacturer can produce.

Use Standard Lengths When Possible

In determining the proper size of tank for your use, it is wise to consider the standard commercial lengths of lumber and order tanks having staves of those lengths, which are in multiples of 1 foot up to and including 10 feet, and thereafter in multiples of 2 feet. This gives you the economy of lower costs.

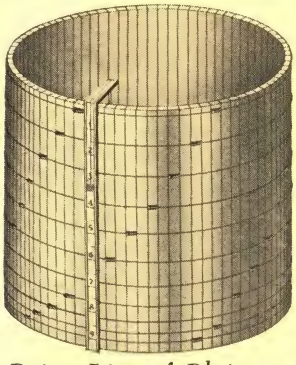
State If Tank Is For Heavy Liquids

If the specific gravity of your tank contents is to be greater than that of water, taken as the standard, please mention what it is so we may fit the tank with the proper number of hoops to maintain the standard factor of safety.

Give Outside Measurements

It is standard practice to give outside measurements when ordering wood tanks. Staves are 1 inch shorter than commercial length of lumber; that is, a 10 by 10 tank would be 10 feet 0 inches outside diameter by 9 feet 11 inches high outside.

Airplane View of National Tank & Pipe Company Plant, Portland, Oregon



Plain Water Tanks

Plain tanks do not have a water channel at top of staves, but are provided with register.

Fitted with round, soft steel hoops and straight-pull malleable iron lugs.

Price List of Plain and Patent Non-Shrinking Water Tanks

Capacity, Gals.	Diameter Ft.	Diameter In.	Height Ft.	Approx. Weight Lbs.	Thickness Inches	List Price	Code Name
500	5	1	4	438	2	$ 32.00	Habet
800	6	0	5	644	2	43.00	Habot
1,000	6	6	5	729	2	50.00	Hablt
1,500	8	0	5	936	2	61.00	Haeli
2,000	8	0	6	1,068	2	70.00	Haelt
2,500	8	0	7	1,200	2	78.00	Hacet
3,000	9	0	7	1,350	2	88.00	Haict
4,000	9	0	9	1,646	2	107.00	Hacot
5,000	10	0	9	1,860	2	121.00	Haclt
6,000	12	0	8	2,132	2	139.00	Hadel
7,000	12	0	9	2,330	2	152.00	Hadil
8,000	12	0	10	2,528	2	165.00	Hadol
10,000	13	8	10	2,963	2	195.00	Hagar
10,000	13	8	10	4,730	3	274.00	Hagal
12,000	14	0	12	5,621	3	323.00	Hagel
15,000	16	0	12	6,588	3	378.00	Hailz
20,000	18	0	12	7,811	3	453.00	Hallo
25,000	18	0	14	8,925	3	523.00	Halti
30,000	20	0	14	10,214	3	598.00	Hamlo
40,000	23	0	14	12,375	3	730.00	Hamso
50,000	24	0	16	14,818	3	886.00	Hamst
60,000	26	0	16	16,527	3	990.00	Hanat
75,000	29	0	16	19,294	3	1,165.00	Hanel
100,000	30	0	20	24,980	3	1,546.00	Handi

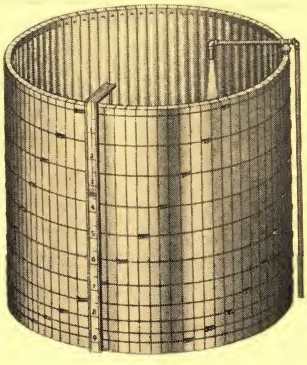
The above list covers both patent and plain Tanks, as illustrated.
All measurements of diameters and heights are outside measure.
Prices in this catalog are for tanks K. D. ready to set up, and do not include frames, covers or foundations.

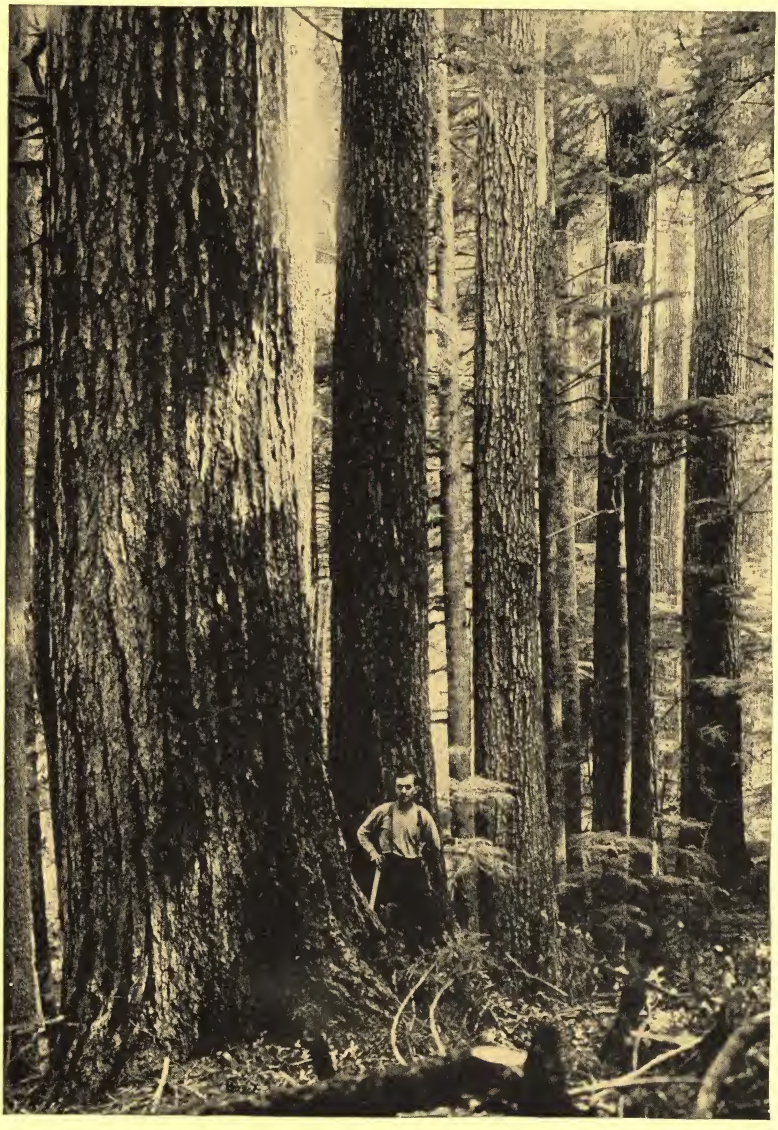
For other sizes see pages 65 to 75.

Patent Water Tanks

The Patent Non-Shrinking Water Tank is provided with a water channel at top of staves, which, when partly full, allows the surplus water to flow into the tank through overflow holes.

Directions for erection given on page 22.





View of Douglas Fir Forest Showing How Fir Lumber For Our Tanks Grows

Douglas Fir Specifications

"National Quality"

Douglas Fir lumber used in "National Quality" Tanks shall be from clear, straight-grained, live timber, free from shakes, decay or large and unsound knots. No more than a small proportion may contain small tight knots and medium pitch pockets that do not extend more than half through the piece.

Edges are required to be practically clear and shall contain no defects which prevent a water-tight joint when milled. Sap may not show except on the outside of the staves or inside of the bottom, and then will cause rejection if its area exceeds 25 per cent of that of the piece. Every defect which will interfere with the strength or durability of the finished piece will force its rejection.

Lumber shall be thoroughly kiln dried before being manufactured. It shall be inspected before being placed in the kiln and again before being milled, and the finished material shall again be subjected to careful inspection before shipment.

Redwood Specifications

"National Quality"

Redwood lumber used in "National Quality" Tanks must be from clear, straight-grained, live timber, free from decay, shakes, splits, large and unsound knots. Not more than a small portion shall contain small tight knots or a reasonable number of birds-eye that does not extend through the piece. Sap shall not show except on the outside of the staves or inside of the bottom and shall not exceed 5 per cent of the surface area.

Lumber shall not contain defects that might impair its strength or durability. All lumber must be thoroughly dried and shall be inspected both before and after milling.

View of Redwood Forest Where We Procure Redwood Lumber For Our Tanks

Tank Specifications

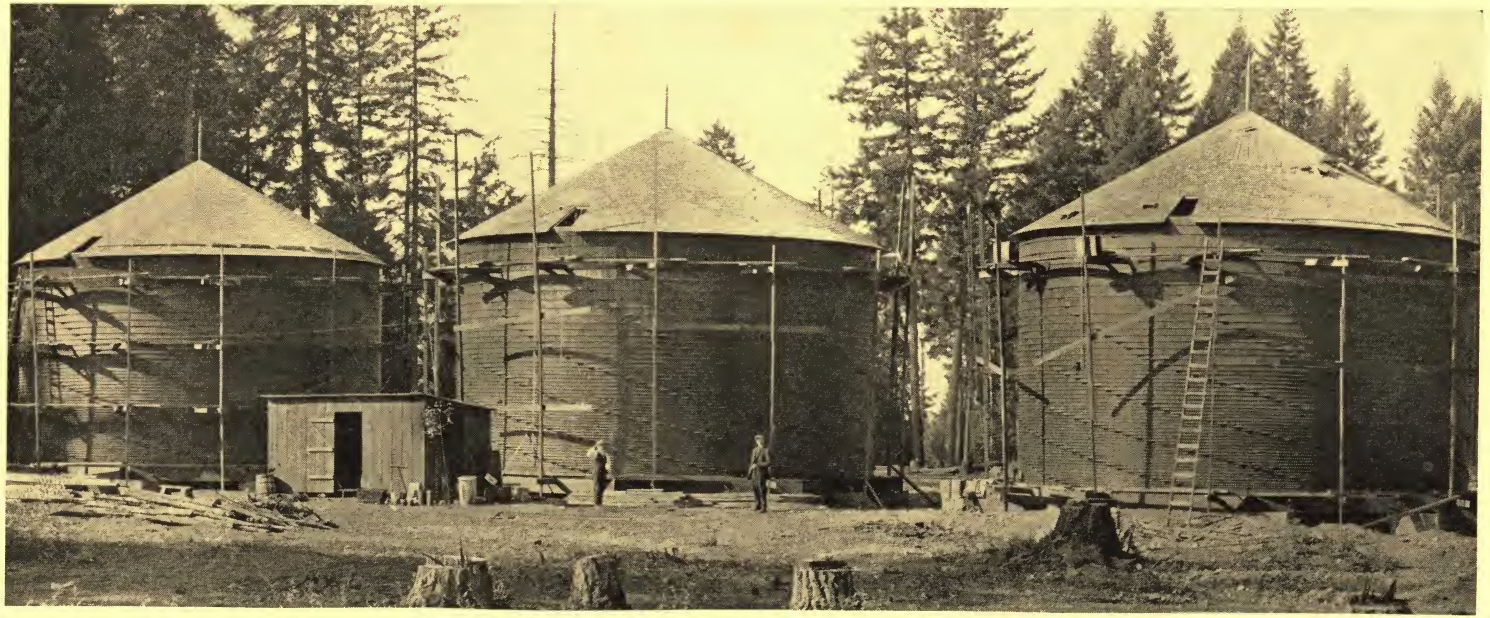
"National Quality"

THICKNESS OF ROUGH LUMBER

	2″	3″	4″	6″	8″	10″
A=	1⅝″	2⅝″	3½″	5½″	7½″	9½″
B=	1⅝″	2⅝″	3½″	5½″	7½″	9½″

	Stave Length	2″ Lumber	3″ Lumber	4, 6, 8 and 10″ Lumber
C=	0′ to 9′	3″	4″	5″
	10′ to 14′	4″	4″	5″
	16′ to 24′	5″	5″	5½″
	24′ and up	5½″	5½″	6″

D=	Net length of staves which is 1″ shorter than rough length. Example: A 10 x 10 tank has staves 9′ 11″ long.



"National Quality" Water Storage Tanks

Tank Specifications

"National Quality"

We have adopted as our Standard Tank one with straight sides, round mild steel hoops, and straight-pull draw lugs. For ordinary purposes there is no advantage in using tanks with tapered staves, but if for any special reason such tanks are desired, we can readily supply them.

Heads

Heads for both upright and horizontal tanks are to be manufactured in the same manner as the bottoms, having the bevel or main chamfer on the inside of the tank.

Staves

The finished length of staves shall be one inch shorter than the specified commercial length of lumber, i.e., when a tank is manufactured from 8-foot lumber, the finished length shall be 7 feet 11 inches. The outside shall be milled to the true periphery of the tank. Unless otherwise specified, the inside of the staves may have a flat face. The edges shall be milled to true radial lines and shall be dressed smooth and true to make a water-tight joint. When placed in tank, they shall touch each other throughout the full length of the stave. Unless otherwise specified, tanks over 20 feet in height shall have spliced staves, the saw kerfs and splines being inserted as specified for the bottoms.

Bilge

With tanks 14 feet in diameter or over, a sufficient number of bilge staves shall be furnished to maintain the sides of the tank in a vertical plane and prevent the convex curve being formed by the cinching of the hoops. On tapered tanks, bilge staves shall be furnished to maintain the staves in diagonal plane. These staves shall be equally spaced around the circumference of the tank during erection.

Packing

All lumber must be packed so as to arrive at destination in proper condition. Tanks for export must be securely packed in accordance with standard practice, all cleats being secured with strap iron securely nailed in place.

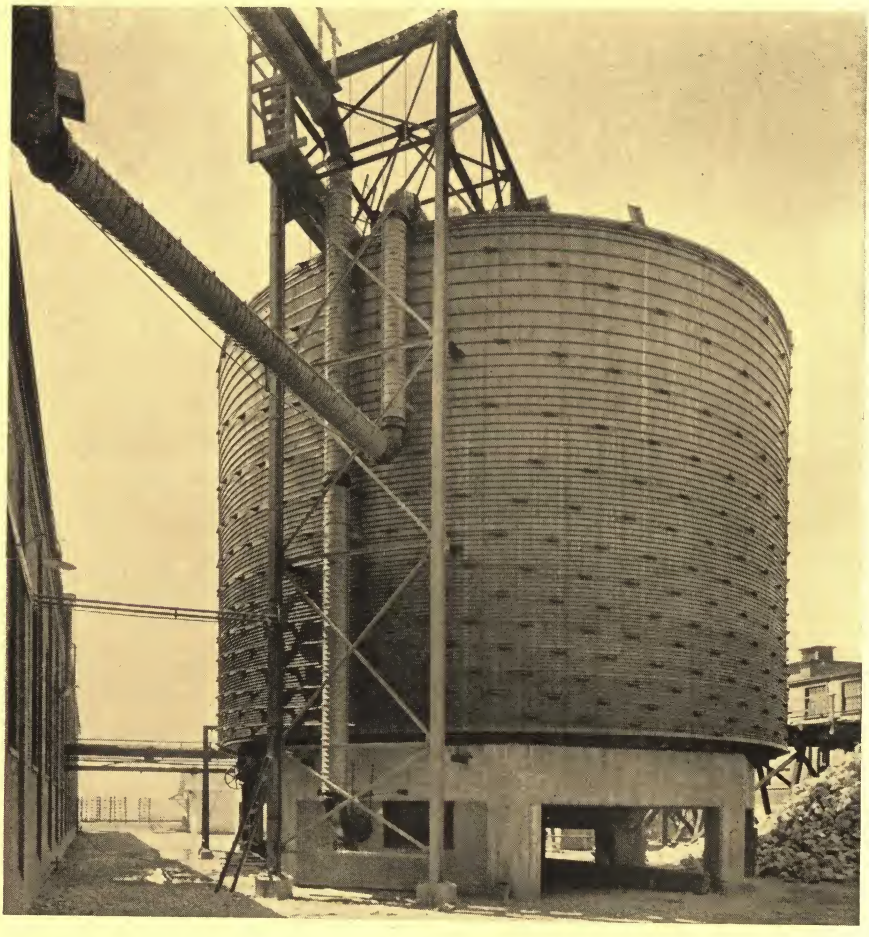
Bottoms

Bottoms shall be cut to a true circle for the proper diameter tank. The bevel or main chamfer shall be on the under side of the bottom to correspond with the croze in the staves.

All bottom pieces are to be doweled. Dowel pins shall not be over 4 feet apart for bottoms less than 2 inches in thickness, nor over 5 feet apart on bottoms of greater thickness. Dowels shall be placed exactly in the center of the plank. Special care must be exercised in boring straight and true dowel holes of the proper diameter.

When necessary, in tanks of over 20-foot diameter, the bottom planks may be spliced. Splices must be staggered, no two adjacent planks being spliced at the same point. Splices shall be scattered evenly over the area of the bottom. There shall be a dowel pin placed not over 12 inches from each joint. Full length planks shall be used in center of tanks when practical. In preparing planks for splices, there shall be a groove cut in the exact center of the bottom board, ¾-inch deep, for the insertion of a ⅛x1½-inch steel spline. Groove shall fit spline snugly. Ends of plank must be cut true and square and splices must be water-tight. The spline shall be cut slightly longer than the joint so that the ends will imbed themselves in the edge of the adjacent planks.

Bottoms up to 20 feet in diameter are to be given a spring of .025 inch to each foot diameter. Bottoms over 20 feet are to be given a spring of .05 inch to each foot diameter.



This "National Quality" Douglas Fir Tank is 50′0″ inside diameter by 32′0″ deep inside and has a capacity of about 471,000 gallons.

Tanks of this size are usually designed to meet a particular requirement. If you have a problem involving special tanks, let our Engineering Department help you work out plans and specifications.

Tank Specifications *(Continued)*

"National Quality"

HOOPS

Tank hoops shall be manufactured from round, mild steel having an ultimate tensile strength of from 55,000 to 65,000 pounds per square inch. The hoops shall be made in sections and each section shall have a button head on one end and 6 inches of U. S. standard cold rolled thread and hexagon nut on other end. The head and the thread and the nut shall have approximately the same ultimate strength as the body of the rod.

The hoops shall be free from any injurious seams, flaws, or cracks and have a workmanlike finish.

HOOP LUGS

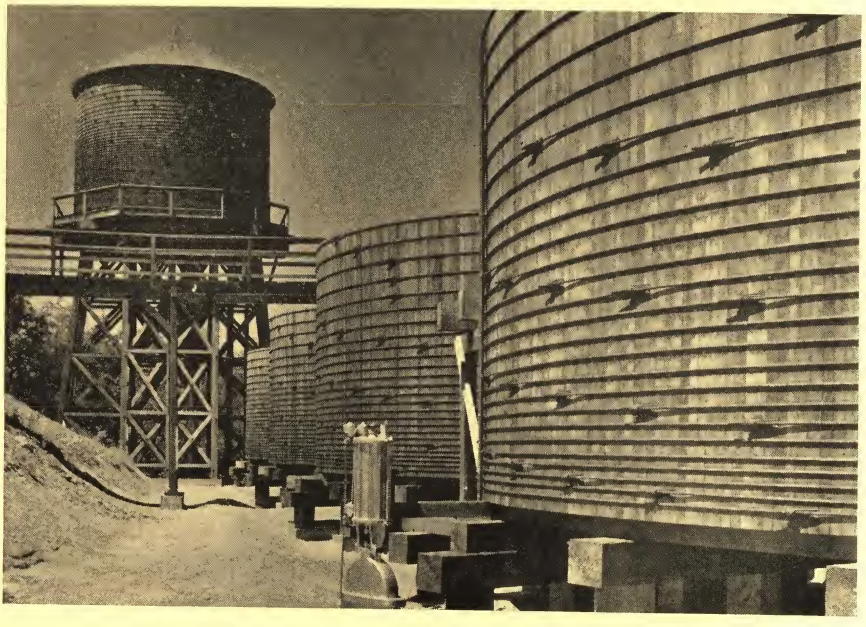
The lugs shall be made of malleable iron and shall be stronger than the tank hoop and shall have sufficient bearing surface to prevent serious injury to the wood staves. The lugs shall be made true to pattern and shall be free from any injurious flaws or cracks.

SPLINES

The steel splines used in large tanks for splicing the bottom and head planks shall be made from mild steel 1/8 inch thick by 1 1/2 inches wide and long enough so that they will protrude into the adjoining planks slightly. All splines shall be galvanized.

SPECIAL TANKS

Where tanks are to be used for industrial purposes for the storage or transportation of corrosive liquids, different specifications are usually necessary. Send us all of the information you have on the conditions under which your tanks will be used, and let our Engineering Department assist you in the design of "National Quality" wood tanks to take care of your particular requirements.



"National Quality" Water Tanks

"National Quality" Acid Tanks

Standard Tank Rods

As a matter of comparison, we refer you to Figure 1. At the right hand side you will note a reproduction of a cut thread and at the left hand side a rolled thread. It is obvious that the rolled thread has the greater strength, and it will easily be seen that the threaded portion of the rod has about the same tensile strength as the body of the rod itself, while in the case of the cut thread the rod is weakened to the extent of the amount of metal removed by the cutting dies.

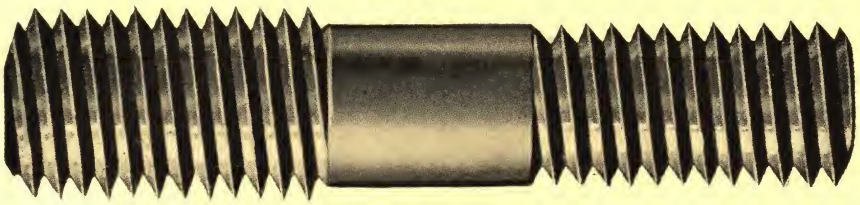
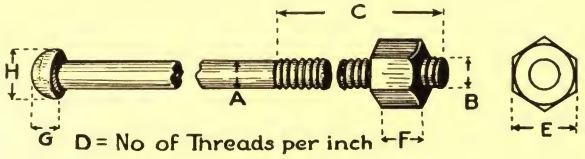


Fig. 1.

All tank hoops used by this Company have rolled threads and heavy hexagon nuts.

While we are prepared to furnish hoops and lugs to any specifications desired, for the reason just explained we have adopted as our standard and carry a large stock of round mild steel hoops with rolled threads, specifications of which are shown in the following table:



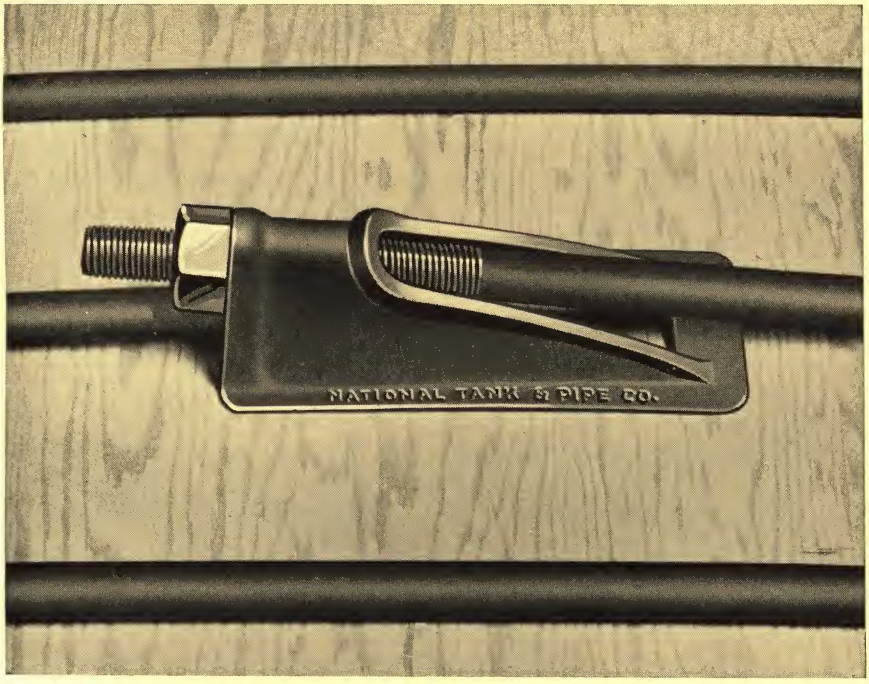
A Size of Band	KIND	Threads			Nuts		Heads	
		B Dia.	C Length Ins.	D per In.	E Short Dia.	F Thick-ness	G Thick-ness	H Width
½	Button Head Hex. Nut.....	9/16	6	12	1 1/16	5/8	13/32	15/16
5/8	Button Head Hex. Nut.....	11/16	6	11	1¼	¾	½	1 1/16
¾	Button Head Hex. Nut.....	13/16	6	10	1⅜	⅞	9/16	1¼
1	Button Head Hex. Nut.....	1 1/16	6	8	1¾	1⅛	¾	1⅝

All list prices in this catalog are subject to discount.

"National Quality" Water Storage Tanks

This installation was made to take care of emergency requirement of several hundred thousand gallons of water storage. The first carload of tanks was shipped to the site of erection within twenty four hours after the order was placed in our factory, and the balance of the tanks was shipped in time to keep our construction crew working continuously until the requirement was taken care of. We carry a large stock of tank materials on hand to take care of requirements of this kind.

Malleable Iron Hoop Lugs



Straight Pull Lugs

We have adopted as our standard the straight pull malleable iron tank hoop lug illustrated above because it will develop the full strength of the hoop without kinking it and it does not injure the tank staves. We carry a large stock of these lugs in all sizes.

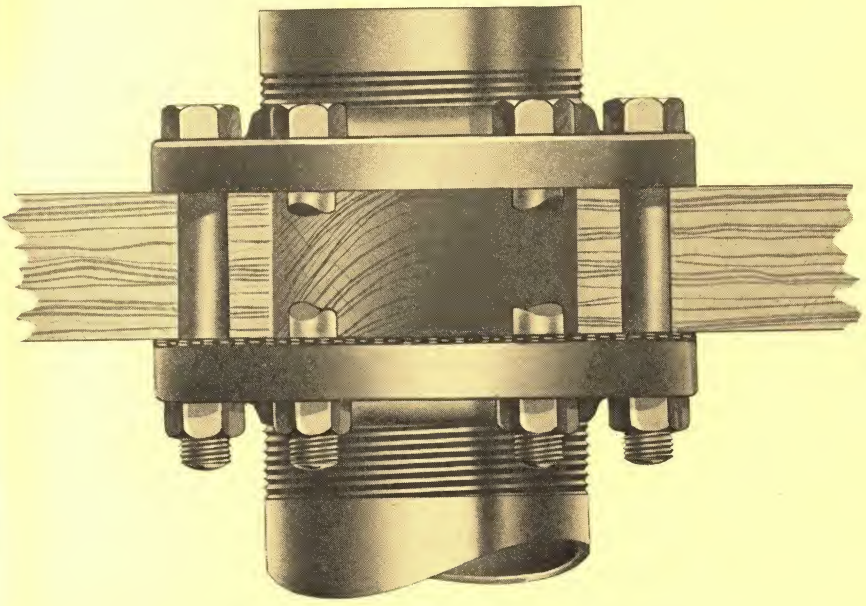
Side Pull Lugs

We are also prepared to furnish the side pull lug illustrated to the left. These lugs are not as efficient as the straight pull type; therefore, we do not recommend them for important installations.

"National Quality" Clarification Tanks

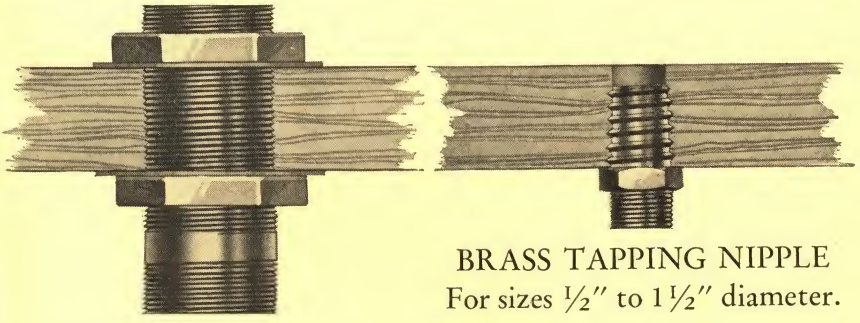
The tanks illustrated above are of a very special design. They are built to clarify water under unusual conditions. It is in the design of special tanks and equipment of this kind that our Engineering Department can be of real service to you. Our organization has had more than forty years of experience in the design, manufacture, and erection of wood tanks. The information we have accumulated through that long experience is available to you through our Engineering Department.

Tank Connections



FLANGED TANK CONNECTION

We suggest this type of tank connection for pipe 4″ diameter and larger. The short nipple on top is intended to form a settling basin for sand and silt. This connection consists of 1 pair of standard flanges, 1 set of bolts, 1 gasket, and 1 nipple for top.



BRASS TAPPING NIPPLE
For sizes ½″ to 1½″ diameter.

LOCK-NUT TANK CONNECTION

For sizes ¾″ to 3½″ diameter.
When ordering tank connection, specify thickness of bottom.

Erecting "National Quality" Pickle Tanks

Directions for Setting Up "National Quality" Wood Tanks

The life of a tank depends largely upon its foundation, which must be well made. Air circulation under the tank is absolutely necessary. The chine joists must be of sufficient size to raise the bottom end of the staves one inch or more above the platform on which the tank is set. The staves should never under any circumstances carry the weight of tank and contents.

On the following four pages we have illustrated and described the proper way to erect a wood tank. In the illustrations we have shown a small tank; however, the same general principles apply to the erection of large tanks.

We maintain a construction organization and are prepared to contract for the complete installation of wood tanks. This organization is built up of men who have had many years of experience in the manufacture and erection of wood tanks.

Tank Erection

Outside pieces of bottom to be spread apart as shown to increase bottom diameter ⅛ inch for each 1 foot of tank diameter.

Hold bottom in place with laths or thin strips lightly nailed. Never nail the bottom boards to either chine joists or foundation.

Scratch line to be made with a scratch gauge equal to depth of croze in stave.

Set first stave across center boards as shown and drive same only half way up to scratch line.

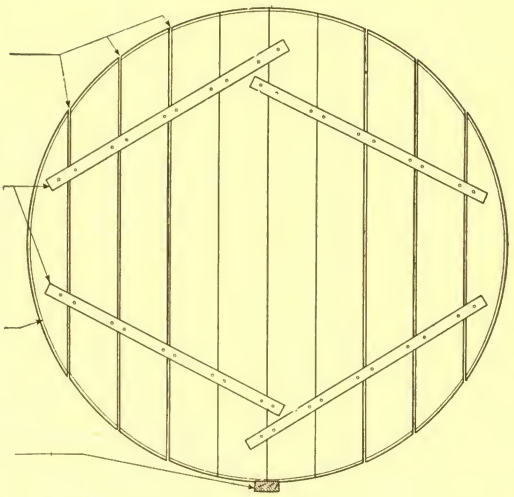
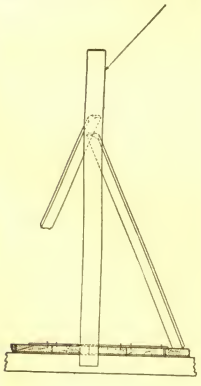
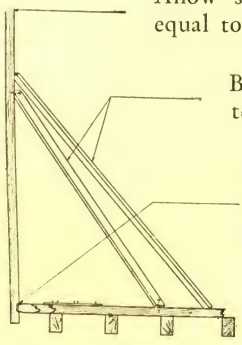


FIGURE 1.
Tank bottom in place with first stave in proper position.
(The chine joists under the bottom are not shown.)

Set this edge of stave vertical with plumb line or spirit level.





Allow staves to slope outward a distance equal to about ¼" for each foot of height.

Brace this first stave to bottom.

Note that staves are first driven only half way up to scratch line.

FIGURE 2.
First stave in position and braced.

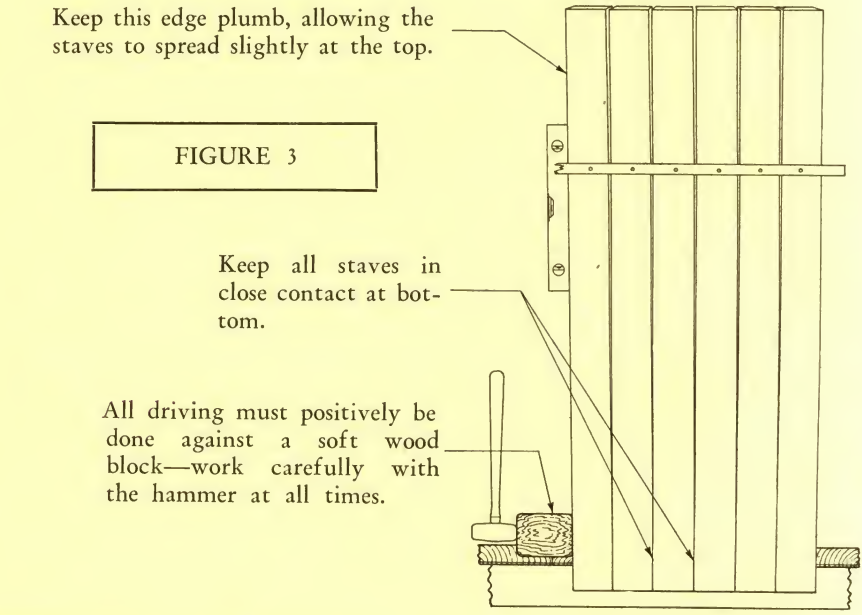
Tank Erection (Continued)

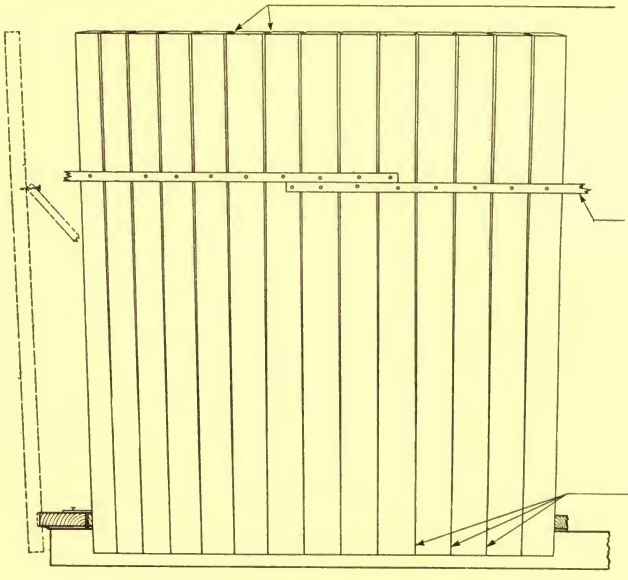
Keep this edge plumb, allowing the staves to spread slightly at the top.

FIGURE 3

Keep all staves in close contact at bottom.

All driving must positively be done against a soft wood block—work carefully with the hammer at all times.





Allow a slight opening between staves at the top.

Nail lath or thin strip lightly on outside to hold staves in place, also brace every twelfth stave to bottom as shown in Figure 2.

Staves must be brought tight together at bottom throughout.

FIGURE 4
Staves are successively placed in position, being held in place with both outside strips and inside bracing.

Tank Erection (Continued)

The last stave may require ripping—if so, measure the width required at this point and be certain the edge bevel is cut and planed correctly.

When last stave is in place, place and partly tighten bottom hoop.

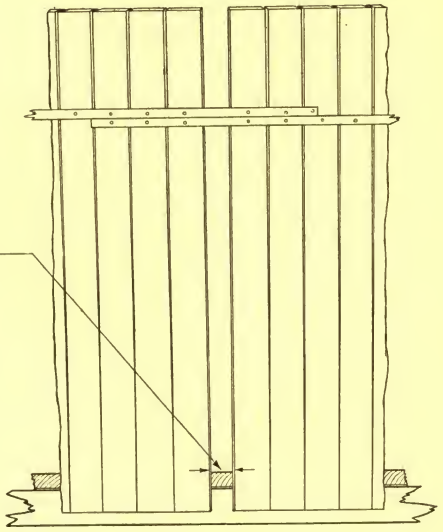
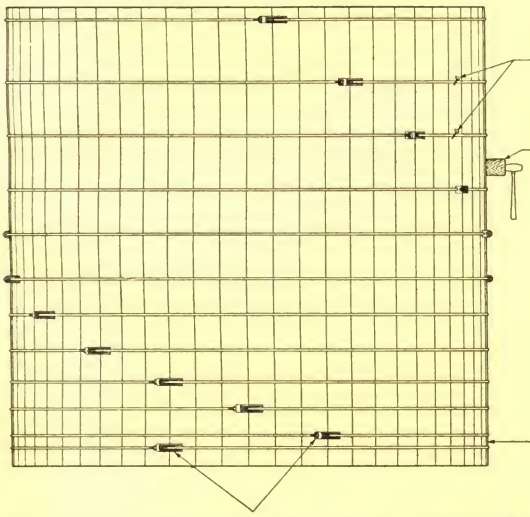


FIGURE 5
The last stave.



Place remaining hoops and hold with nails, then remove all braces, nailing strips, etc.

Tighten all hoops uniformly and gradually, working several times around the tank. At the same time round out the tank and smooth up the joints between staves.

When rounding out the tank drive the staves up to the scratch line. Work around the tank several times, driving a small amount each time.

Separate the two bottom lugs about 3 feet and then spiral the remaining lugs around the tank as shown. Each lug bears on two staves.

FIGURE 6
Placing and tightening hoops—threads point to left.

Tank Erection (Continued)

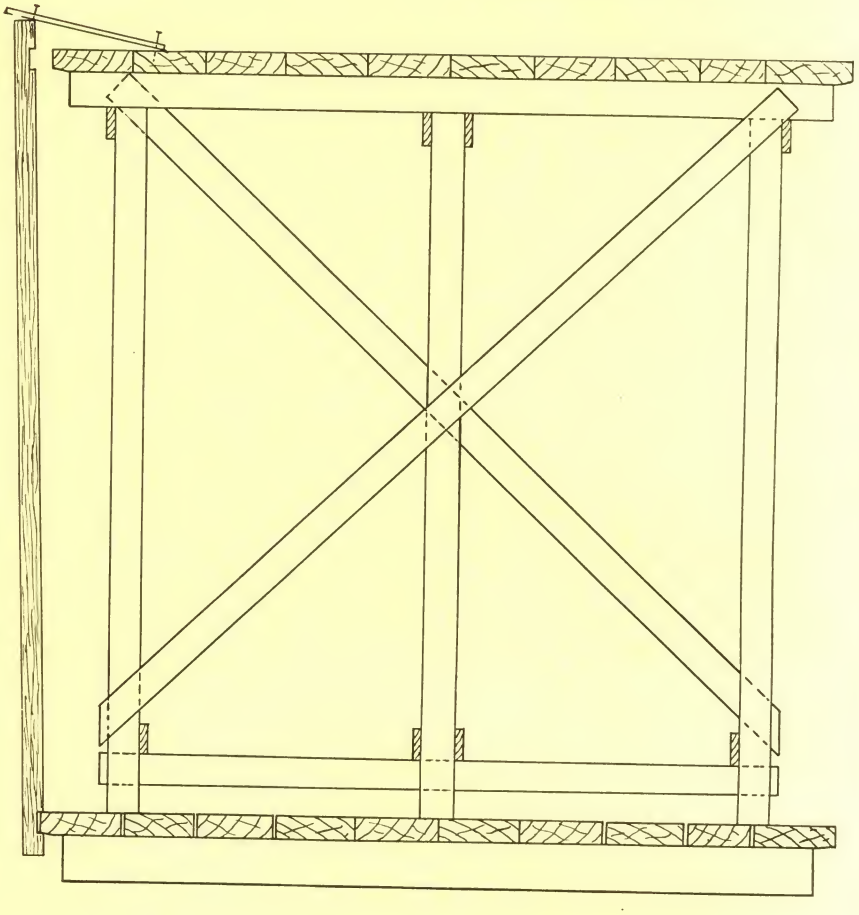
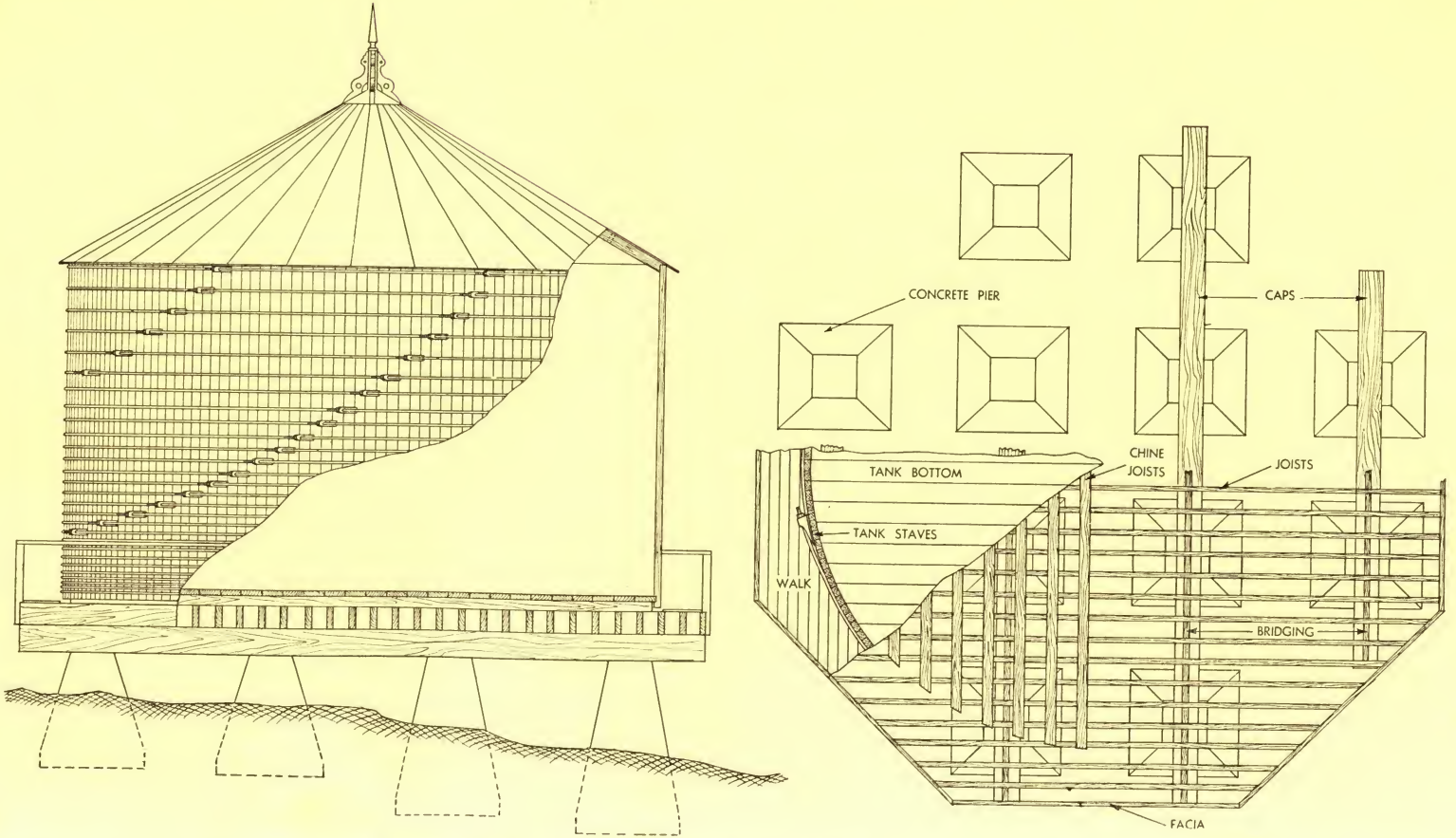


FIGURE 7
Erecting Headed Tanks

Place the tank bottom as shown in Figure 1. Erect supports and place head as shown above. Set staves as shown in Figure 3, 4 and 5 and brace them to the head as shown above. Place hoops as shown in Figure 6 and staves will close up around head.

125,000 *gallon "National Quality" water tank on a* 50-*foot wood tower.*

If you have a tank and tower problem, let our Engineering Department help you work out your plans and specifications.



Typical Wood Tank Foundation Using Concrete Piers

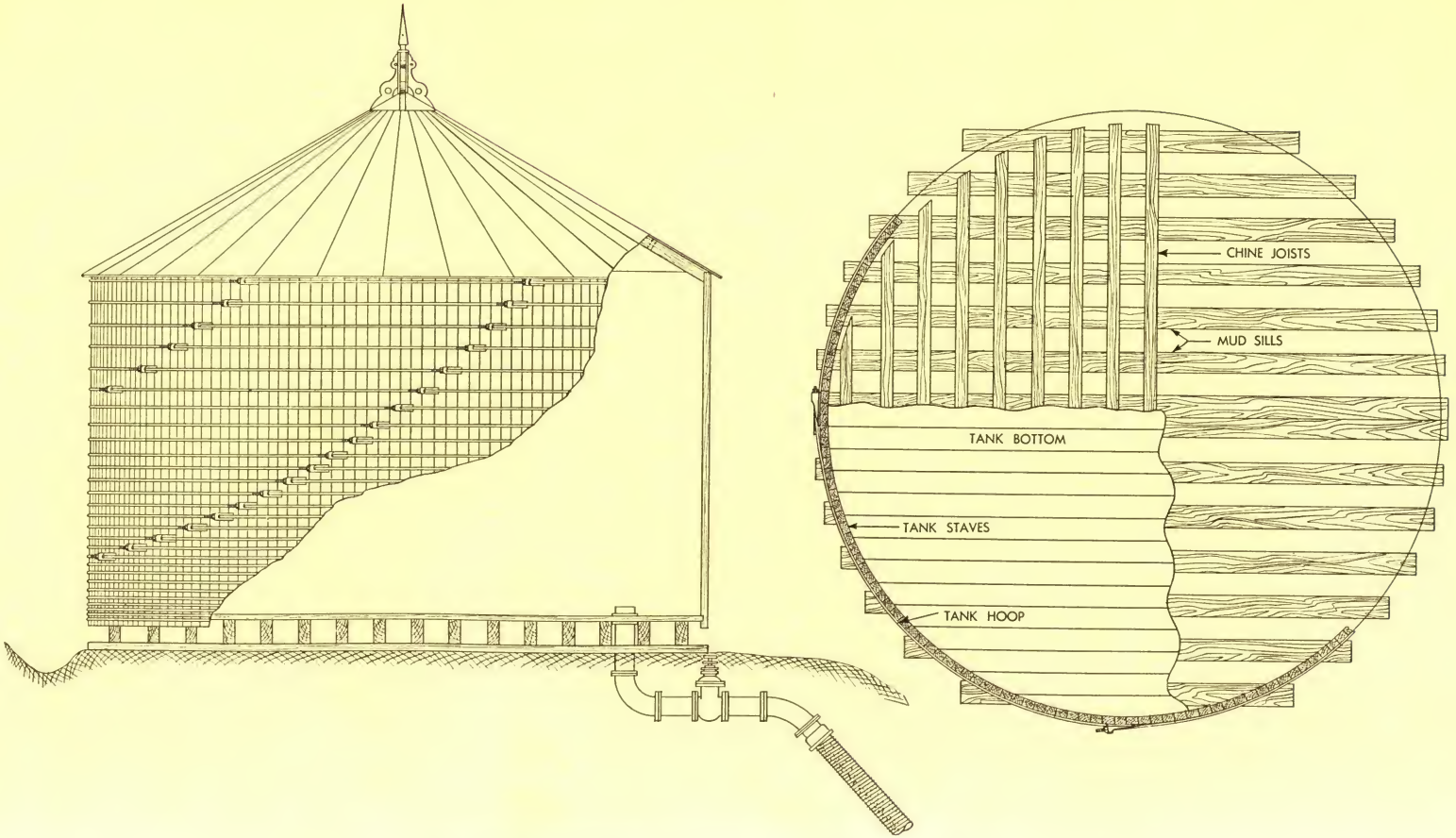
Wood Tank Foundations

63,000 gallon "National Quality" Water Tank

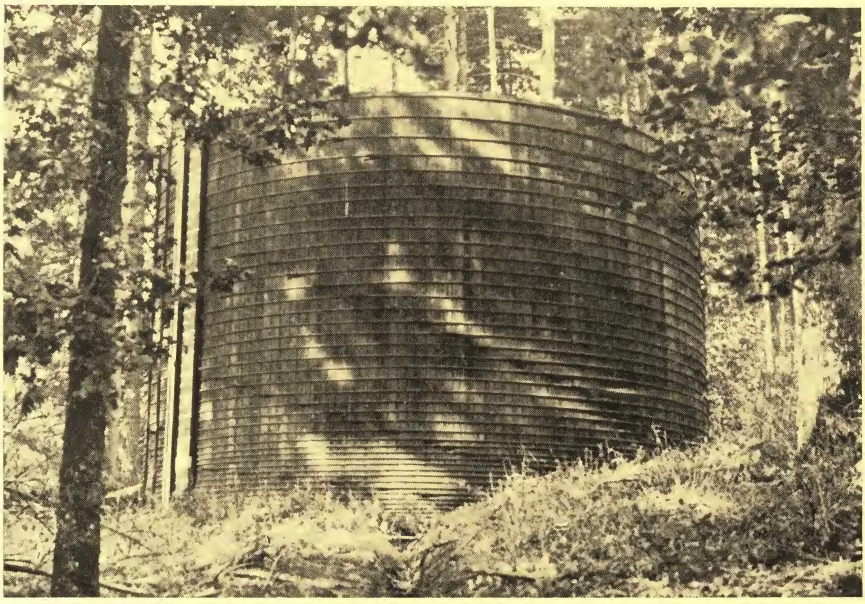
On these and the following eight pages we illustrate five types of foundations. The size of the piers and other parts of the foundation varies with the size of the tank and the field conditions.

The design of a tank foundation depends largely upon the bearing value of the soil. The selection of the type of foundation to be used and the determination of the bearing value of the soil should be entrusted to a qualified engineer who is familiar with the local field conditions.

Our Engineering Department will be glad to assist you in the design of any type of foundation you may require.



Typical Creosoted Douglas Fir Tank Foundation

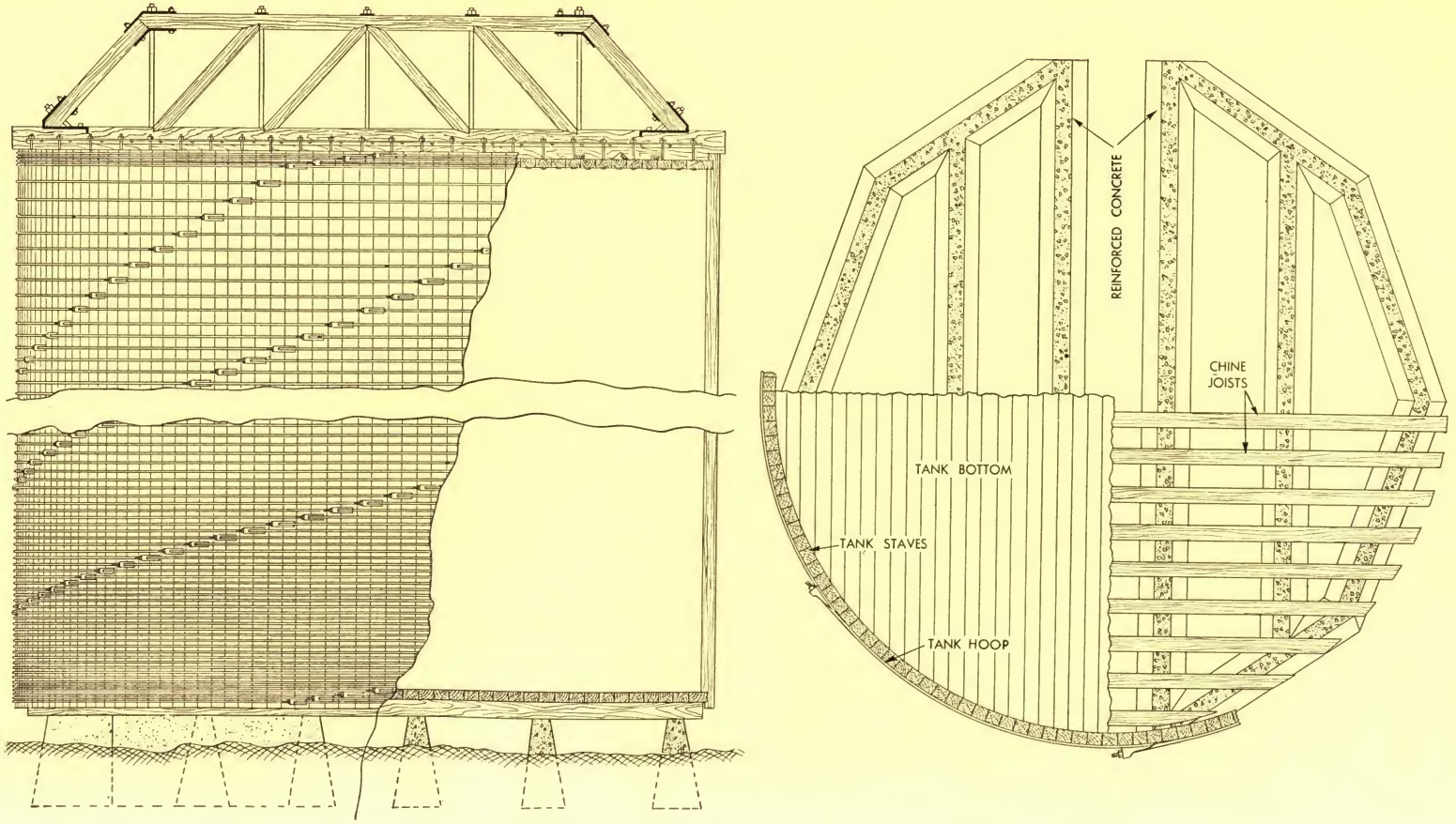


100, 000 gallon "National Quality" Water Tank

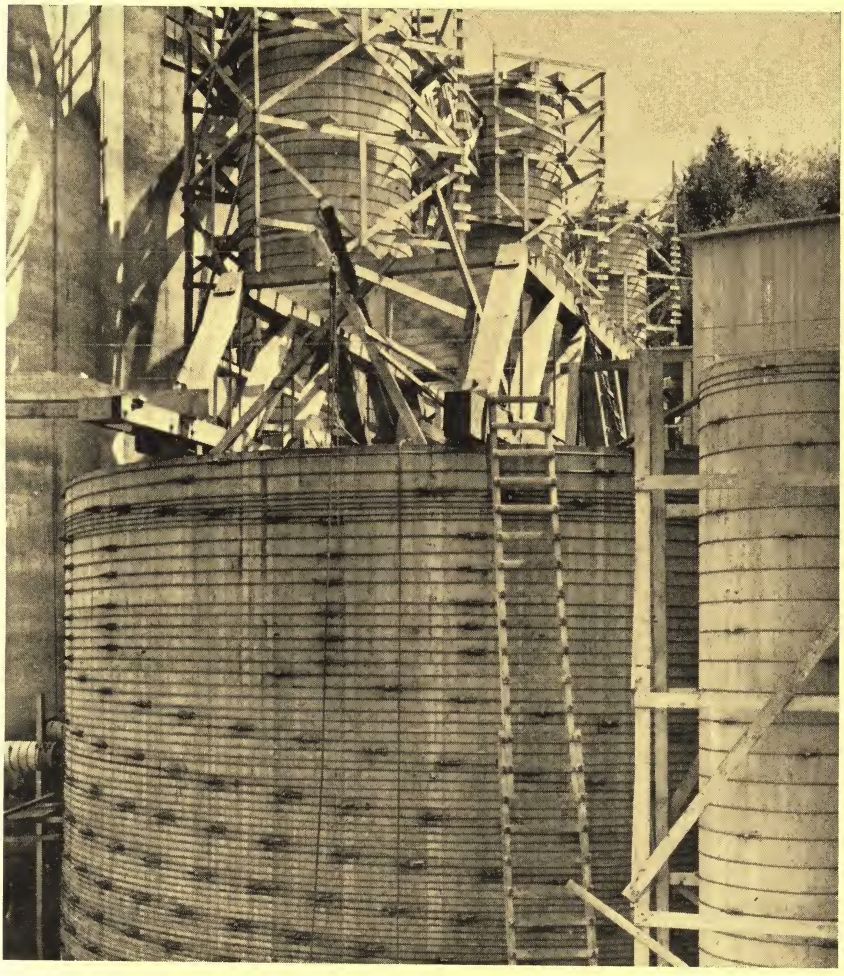
Creosoted Fir Foundation

This wood tank foundation manufactured from heavy Douglas Fir timbers given an 8 lb. pressure treatment of creosote oil is a permanent installation. We are prepared to furnish these foundations completely fabricated and creosoted, ready to install, for any size tank. When requesting prices on creosoted Douglas Fir foundations, let us know the bearing value of the soil on which the foundation is to rest and the diameter and height of the tank, and we will furnish a blue print of the foundation with our quotation.

The determination of the bearing value of the soil should be entrusted to a qualified engineer who is familiar with the local field conditions.



Reinforced Concrete and Timber Foundation

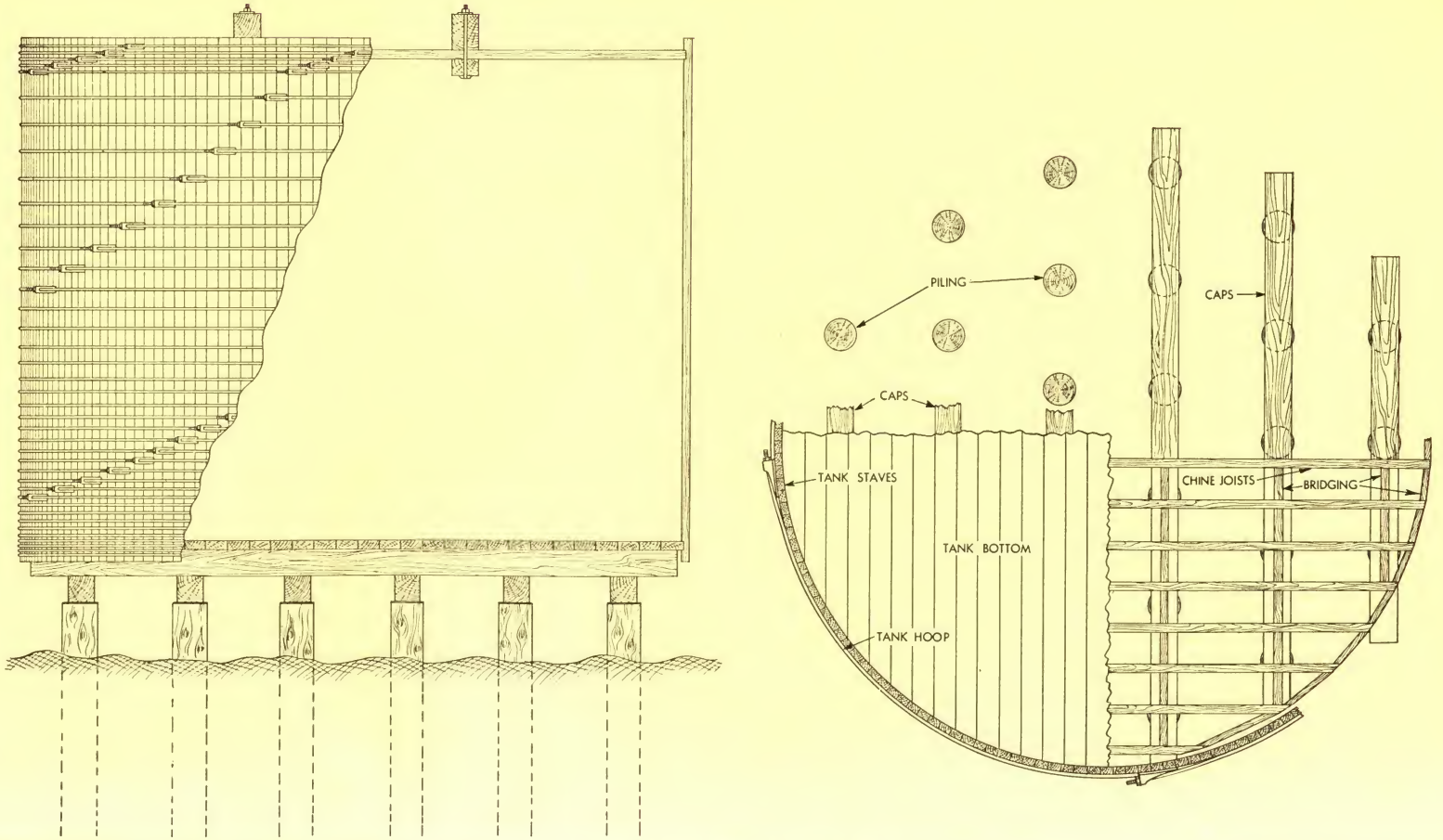


"National Quality" Chemical Tanks

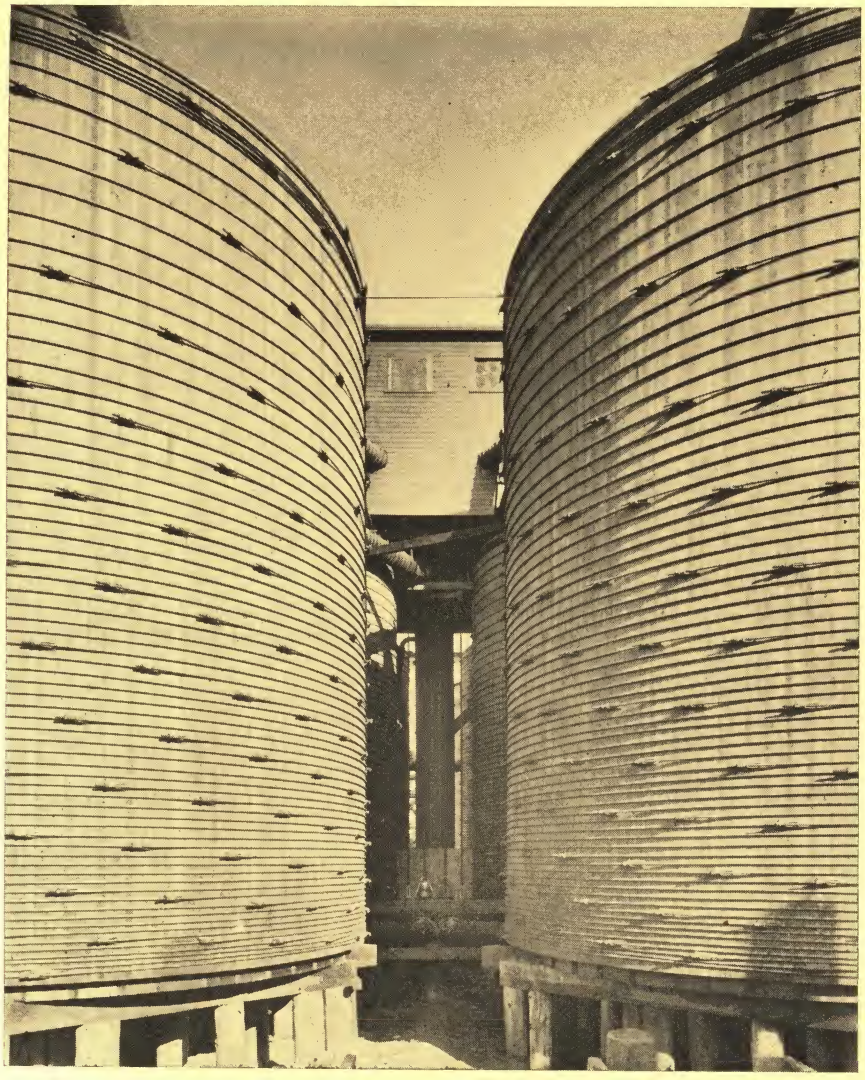
On this page is illustrated a heavily constructed "National Quality" Chemical Tank. Heavy trusses are used to hold equipment placed on tank head.

The illustration on the opposite page also shows a type of concrete and timber foundation that is sometimes found economical.

When confronted with problems involving special tanks, let our Engineering Department work with you.



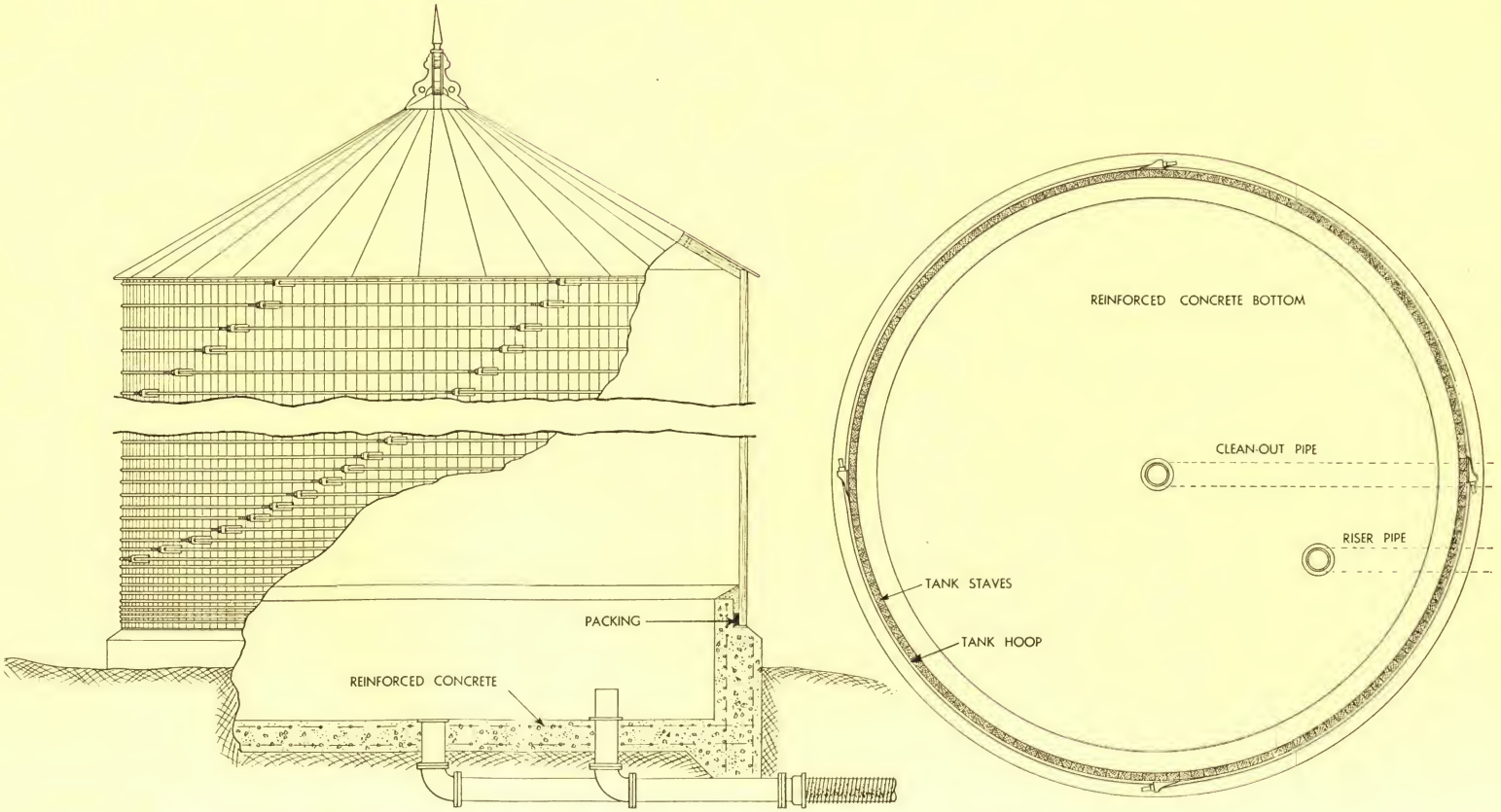
Piling and Timber Foundation



"National Quality" Industrial Tanks

"National Quality" Wood Tanks are designed to meet the requirements of each particular use. The above tanks rest on a piling and timber foundation as illustrated on opposite page.

The design of piling foundations should be entrusted to a qualified engineer who is familiar with the local field conditions.

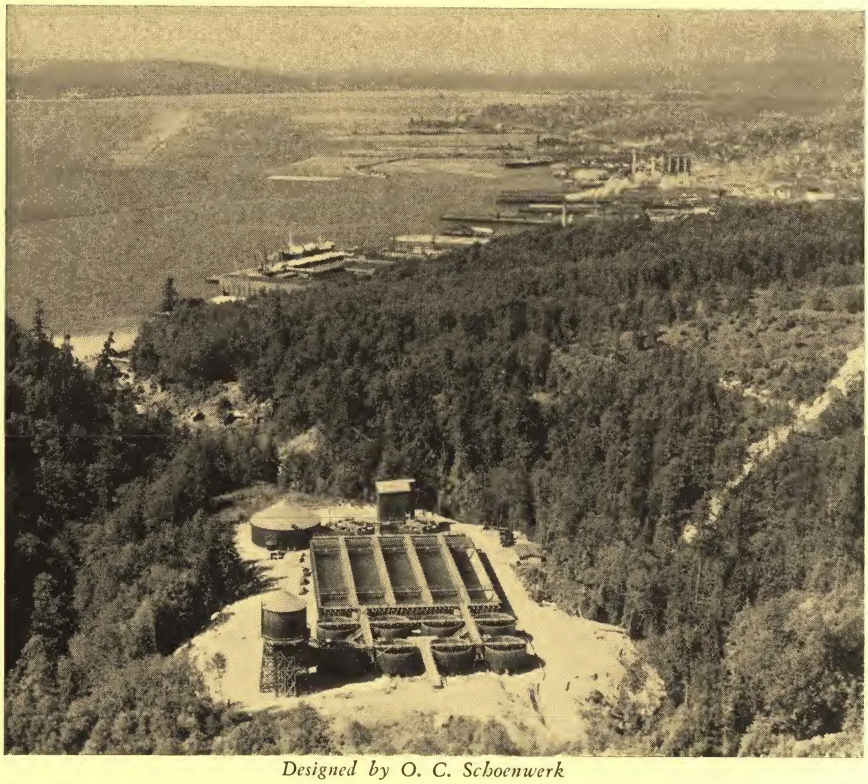


Wood Tank with Reinforced Concrete Bottom

"National Quality" Surge Tank

This type of construction, using a concrete bottom and wood staves, has a distinct application in the design of high tanks, very large diameter tanks, or tanks having many large pipe connections in bottom.

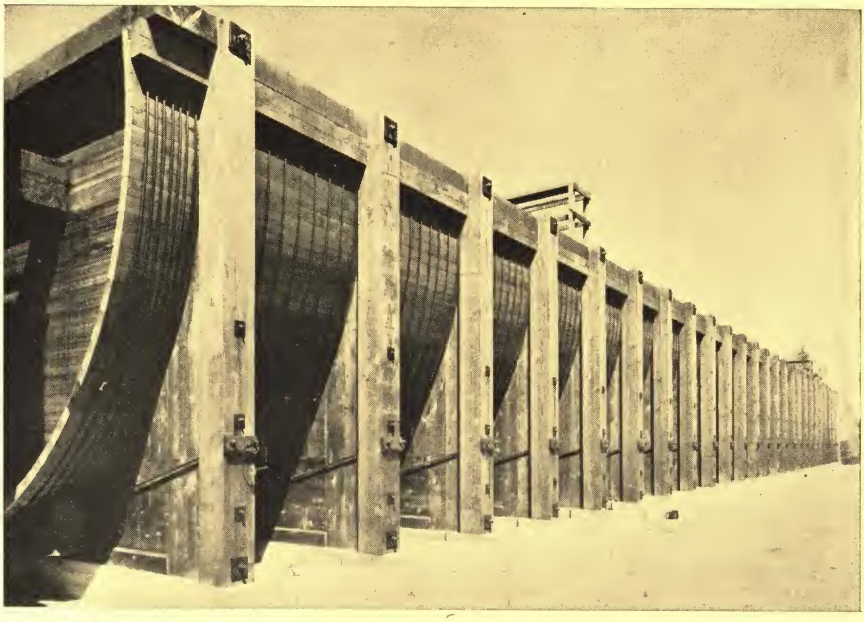
Water Purification



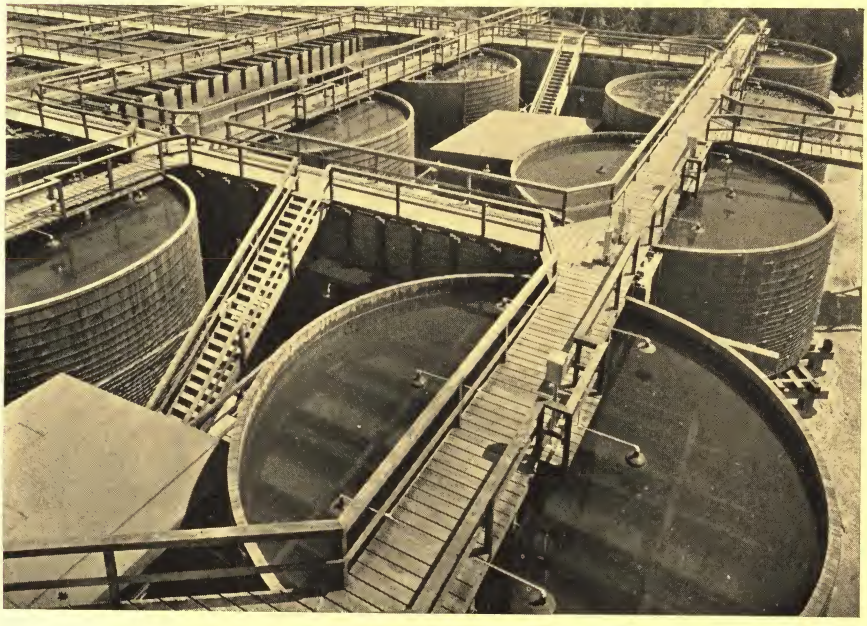
Designed by O. C. Schoenwerk

18,000,000 ***gallon per day Water Purification Plant constructed entirely of "National Quality" Wood Tanks and Wood Pipe.***

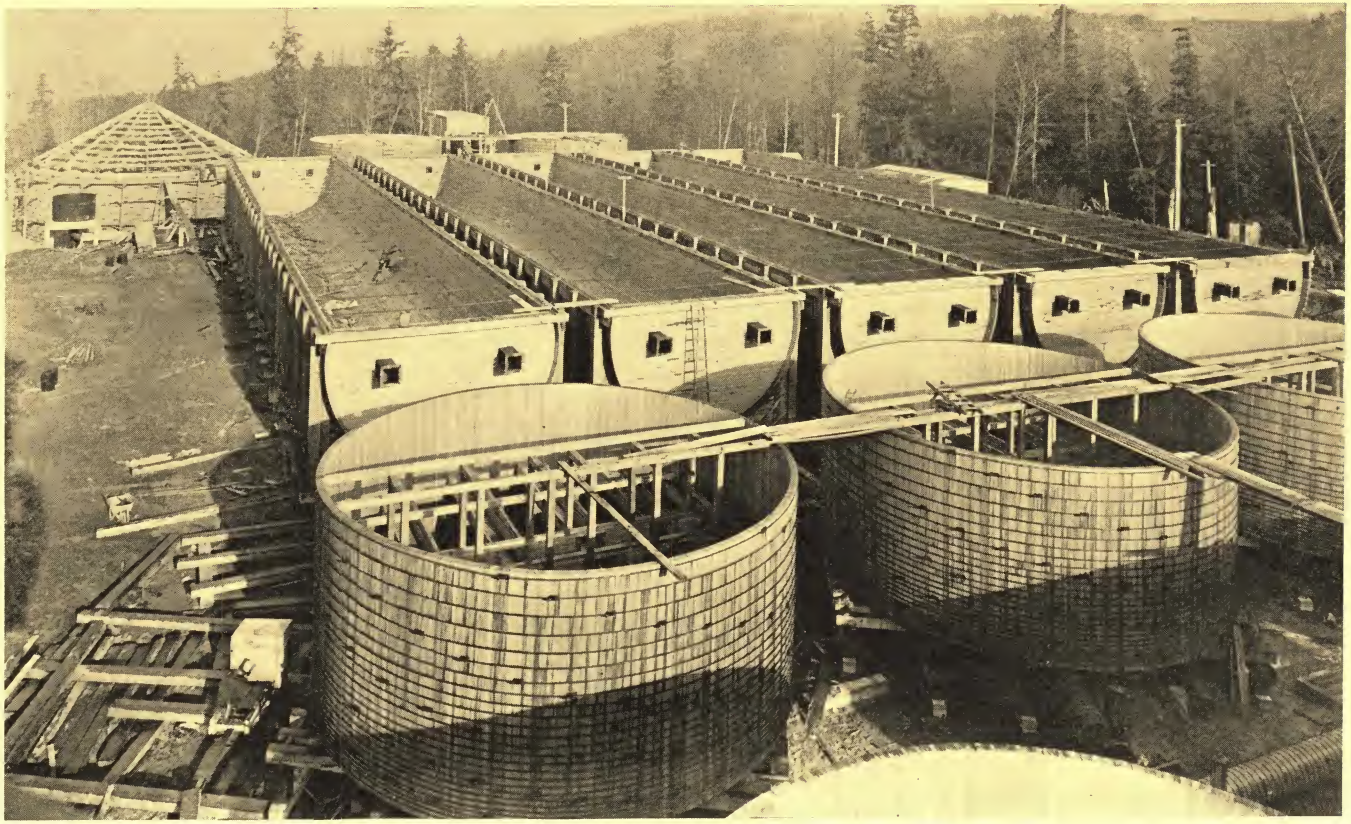
"National Quality" Wood Tanks and Wood Pipe made possible the construction of this modern water purification plant. A plant of this type can be made in units of any capacity. A sufficient number of units can be installed to take care of your present requirements and additional units added from time to time in the future to take care of your increased demand for pure, clean water. With this new type of construction it is unnecessary to make the large investment at the present time to take care of future requirements.



"National Quality" Patent Semi-Circular Settling Tank

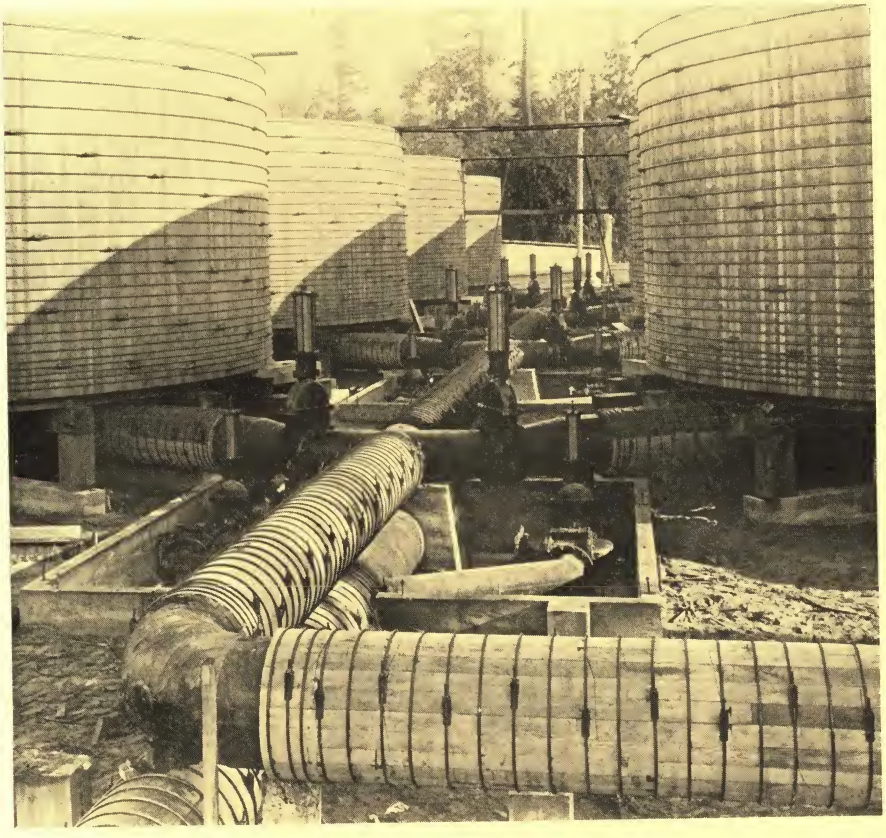


"National Quality" Filter Tanks



"National Quality" Wood Tanks

Under construction in a modern water purification plant.



"National Quality" Water Filter Tanks

These illustrations show "National Quality" Wood Tanks being constructed for a modern water purification plant. The half-round tanks in the picture on the opposite page are 24 feet in diameter by 14 feet deep by 172 feet long and are used for settling basins.

When confronted with such problems as these, let our Engineering Department work with you.

Prices on Application.

Patent Non-Shrinking Oil Tanks

"National Quality" PATENT NON-SHRINKING OIL TANK installation serving an industrial railroad.

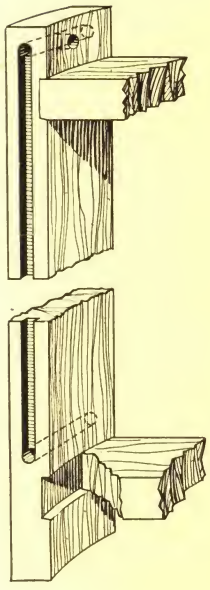
Where and How Patent Oil Tanks Excel

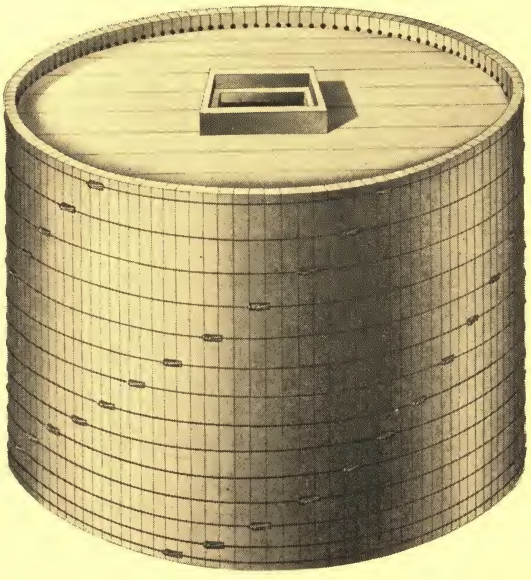
Oil always tends to shrink wood; therefore, a plain wood tank not of the Patent type is sure to shrink, no matter how thoroughly seasoned the lumber used in making it may have been. With the ordinary wood tank the shrinking necessitates much attention and frequent tightening of the hoops.

The improved patent feature is quite clearly shown in the accompanying illustrations. After the tank is erected the head is flooded with water. In this manner the channels are filled and the staves are kept moist at all times, thus preventing shrinkage of the wood and escape of the oil between the staves. This applies to the Headed Tank.

In the Open Top Tank, the channel is connected with a water supply through a small hole in the top of the stave and circulation is provided by means of an outlet bored in the upper horizontal channel on the opposite side of the tank. This discharge should be connected to a drain and a small amount of water be allowed to run through the channels at all times.

Closed Top Patent Non-Shrinking Oil Tank

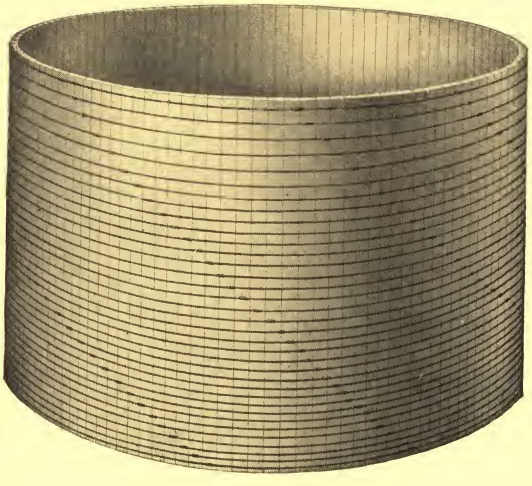


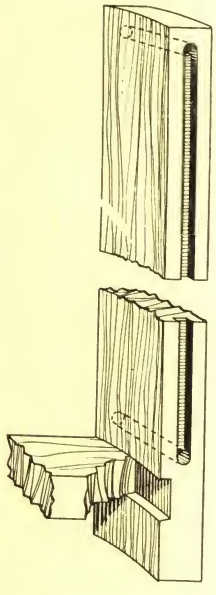


Where fire protection is a factor, as it generally is in the storage of oil, it will be money well invested to install the Headed type of Patent Tank. The water poured at intervals on the top of this tank forms a fire-proof water seal that may prove invaluable.

Capacity Bbls.	Diameter Ft.	In.	Height Feet	Approximate Weight Lbs.	Thickness Inches	List Price	Code Name
100	10	6	8	3,547	3	$ 206.00	Handl
125	11	0	9	4,084	3	239.00	Hando
150	12	0	9	4,587	3	268.00	Hangi
200	13	0	10	5,732	3	326.00	Hangl
300	16	0	10	7,450	3	426.00	Hangm
400	16	9	12	8,867	3	511.00	Haple
500	18	6	12	10,137	3	581.00	Haplo
600	21	0	12	11,952	3	695.00	Haran
800	21	6	14	14,251	3	826.00	Harra
1000	24	0	14	16,751	3	975.00	Harel
1200	25	0	16	19,726	3	1160.00	Harfa
1500	27	6	16	23,009	3	1344.00	Haret
2000	32	0	16	29,420	3	1723.00	Harme

Patent Open Top Oil Tanks





All channels between the staves are filled with water by connecting one of the channels, near the top of the tank, with a water supply. This water in the channels keeps the wood saturated and prevents the oil from escaping between the staves.

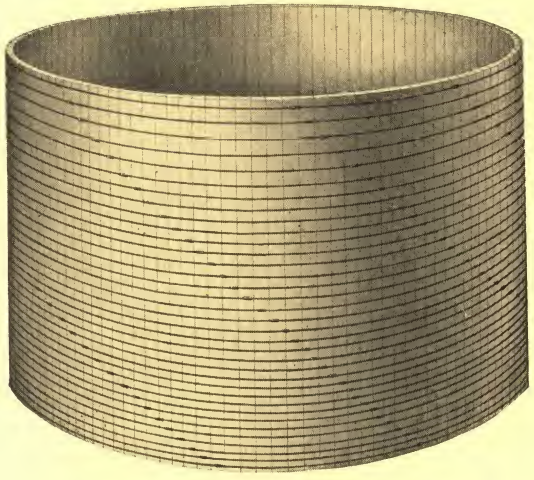
Capacity Bbls.	Diameter Ft.	Diameter In.	Height Feet	Thickness Inches	Approx. Weight	List Price	Code Name
300	15	6	10	3	5,520	$ 316.50	Harpe
400	16	6	12	3	6,828	391.00	Harpo
500	18	3	12	3	7,850	455.50	Harpa
600	20	0	12	3	8,775	505.00	Harps
800	21	0	14	3	10,730	625.50	Hastl
1000	24	0	14	3	13,060	775.00	Haslo
1200	26	0	14	3	14,666	870.50	Hasmo
1500	29	0	14	3	17,016	1022.00	Hatem
2000	32	0	16	3	22,063	1338.00	Hatil

All measurements of diameters and heights are OUTSIDE measures. Capacities in this list are figured on a basis of 42 gallons per barrel.

For tanks of different dimensions and capacities than listed herein, write for special net prices and specifications.

Plain Oil Tanks

Open Top

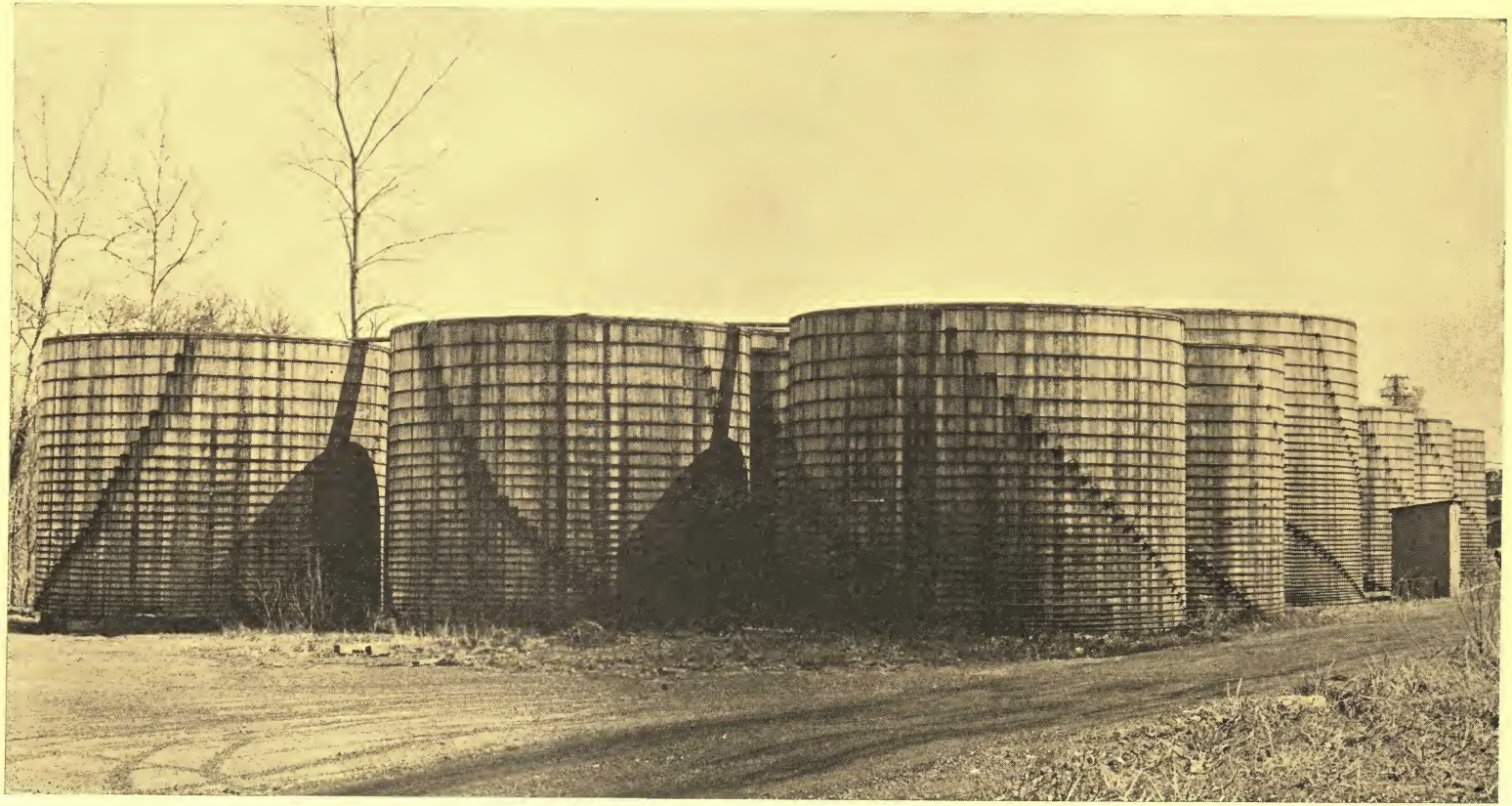


Complete, ready to set up, fitted with round, soft steel hoops and straight pull malleable iron lugs.

Capacity Barrels	Diameter Ft.	Diameter In.	Height Feet	Approximate Weight	Thickness Inches	List Price	Code Name
10	5	0	4	433	2	$ 32.50	Hatom
20	6	0	5	640	2	46.00	Haugh
25	6	0	6	755	2	54.00	Haugl
40	7	6	6	977	2	67.50	Hauhe
50	8	4	6	1,092	2	76.00	Hauha
75	9	4	7	1,407	2	93.00	Hauho
100	10	0	8	1,689	2	110.25	Haver
125	11	3	8	1,946	2	127.50	Havor
150	11	7	9	2,221	2	145.50	Havle
200	12	8	10	2,671	2	174.00	Havlo
300	15	6	10	3,439	2	223.50	Hawke
400	16	6	12	4,258	2	276.00	Hawko
500	18	3	12	4,930	2	324.50	Hawkl
600	20	0	12	5,491	2	358.00	Hawth
300	15	6	10	5,520	3	316.50	Haylo
400	16	6	12	6,828	3	391.00	Hayle
500	18	3	12	7,850	3	455.50	Haymo
600	20	0	12	8,775	3	505.00	Hayno
800	21	0	14	10,730	3	625.50	Hayde
1000	24	0	14	13,060	3	775.00	Haybe
1200	26	0	14	14,666	3	870.50	Hazar
1500	29	0	14	17,016	3	1022.00	Hazel
2000	32	0	16	22,063	3	1338.00	Hazom

Prices on tanks listed in this catalog are for tanks knocked-down, ready to set up.

All prices in this catalog are subject to discount

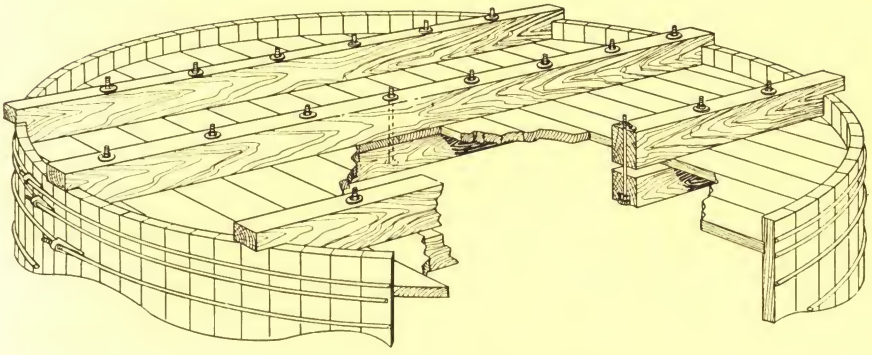


"National Quality" Vinegar Storage Tanks

"National Quality" Vinegar Tanks

Durable and Economical

Forty years of constant study and experience in making tanks . . . an ideally equipped plant . . . a location in the heart of the world's greatest lumber country . . . a staff of experienced craftsmen, grown skillful in tank making . . . these are the reasons back of the success of "National Quality" Vinegar Tanks. Careful buyers the world over order them.

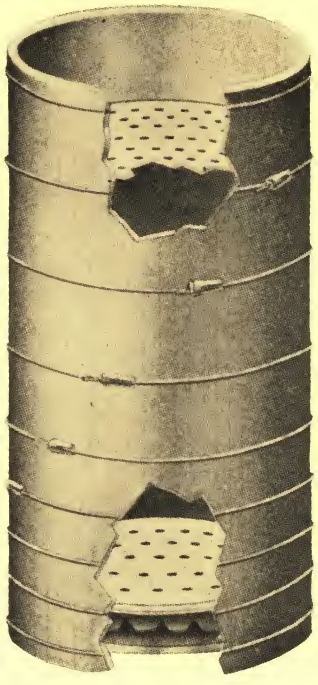


Vinegar Storage Tank Head Supports

The above illustration shows one type of head support for vinegar storage tanks that has proved to be very successful. The size and spacing of the timbers and bolts naturally vary with the size of the tank.

Our Engineering Department will be pleased to furnish blue prints covering the construction of head supports, using the type of construction illustrated above or any other type of construction that you may desire.

Vinegar Generators



In addition to tanks of all kinds, we also make vinegar generators, as shown in the above illustration.

Listed below are the sizes most generally used, but we make larger and smaller sizes if desired.

We can also furnish tanks for generators to be used with equipment other than perforated bottoms and heads.

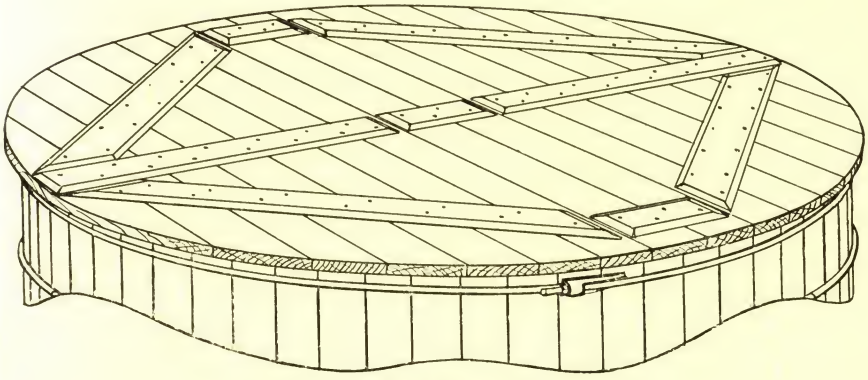
In manufacturing vinegar generators, it is necessary to use only the finest materials, and the workmanship must not be overlooked, as it requires expert knowledge in setting up the machinery so that all the bevels will be properly made, and the finished parts, when assembled, will fit snugly and absolutely tight. "National Quality" vinegar generators measure up to all of the above requirements.

The vinegar generators listed below are fitted with perforated heads and false bottoms as shown in above illustration.

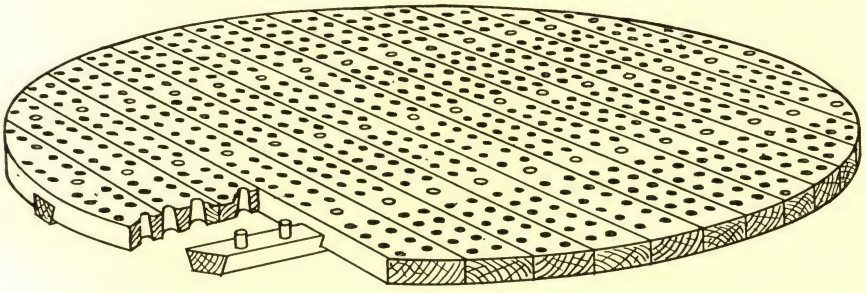
Outside Diameter Ft.	Outside Diameter In.	Outside Height Ft.	Outside Height In.	Thickness Inches	Approximate Weight	List Price	Code Name
4	0	8	0	2	762	$ 58.00	Kakox
5	0	12	0	2	1328	94.00	Kalei
6	0	16	0	2	2072	147.50	Kalen

Prices on other sizes on application.

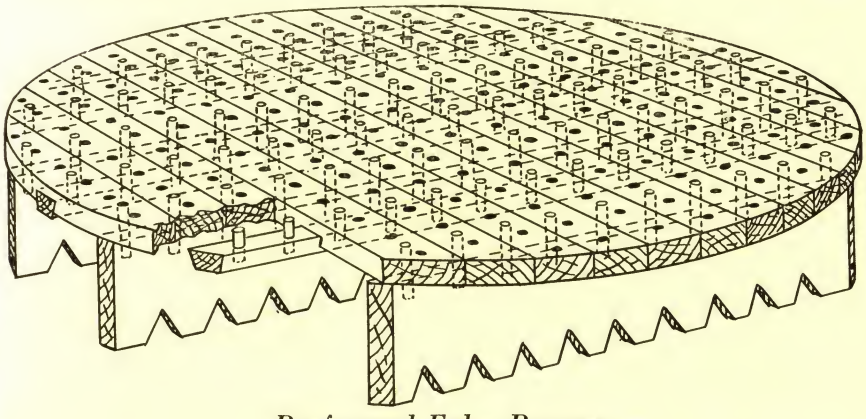
Vinegar Generators



Flat Cover

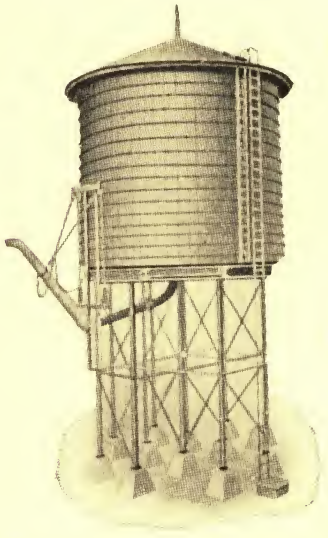


Perforated Head



Perforated False Bottom

Prices on Application



Railroad Tanks

Prices listed are for Tanks only, fitted with round, soft steel hoops and straight pull malleable iron lugs; without Covers, Fixtures or Substructures.

We contract for the erection of Railroad Tanks, including wooden or steel Substructures, Tank Fixtures, Covers, also the installation of concrete foundations, or we will furnish material only f. o. b. factory.

Write us for prices on complete outfits or any part thereof.

Untreated

Capacity Gallons	Diameter Ft.	Diameter In.	Height Feet	Approximate Weight Lbs.	Thickness Inches	List Price	Code Name
10,000	13	8	10	4,813	3	$296.00	Ignor
12,000	14	0	12	5,862	3	350.50	Ignoc
15,000	16	0	12	6,831	3	405.00	Image
20,000	18	0	12	7,941	3	471.00	Imbec
25,000	18	0	14	8,928	3	530.00	Imbid
30,000	20	0	14	10,213	3	605.00	Imbre
40,000	23	0	14	12,368	3	736.00	Imita
50,000	24	0	16	14,818	3	893.50	Imite
60,000	26	0	16	16,527	3	997.00	Impac
75,000	29	0	16	19,279	3	1171.00	Impai
100,000	30	0	20	24,980	3	1554.00	Impas

Creosote Pressure Treated

Capacity Gallons	Diameter Ft.	Diameter In.	Height Feet	Approximate Weight Lbs.	Thickness Inches	List Price	Code Name
10,000	13	8	10	6,153	3	$401.00	Impih
12,000	14	0	12	7,390	3	475.50	Impho
15,000	16	0	12	8,623	3	552.00	Imphe
20,000	18	0	12	10,024	3	641.50	Jabbe
25,000	18	0	14	11,261	3	720.50	Jabir
30,000	20	0	14	12,877	3	823.00	Jacam
40,000	23	0	14	15,559	3	997.00	Jachu
50,000	24	0	16	18,529	3	1197.00	Jacon
60,000	26	0	16	20,640	3	1333.50	Jacen
75,000	29	0	16	24,011	3	1578.00	Jache
100,000	30	0	20	30,755	3	2027.00	Jacka

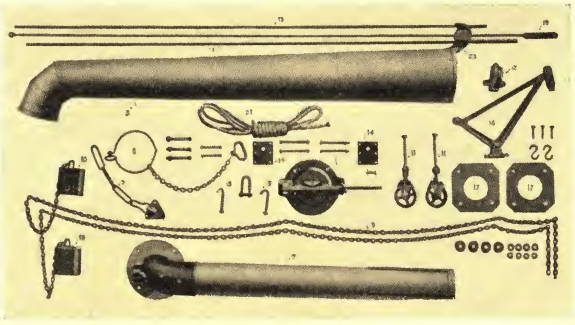
Railroad Tanks

"National Quality" Railroad Tanks are manufactured from the finest quality of materials and workmanship. They are truly a fine product and the most economical and efficient means of storing water for railroads and other industrial purposes.

When required for a permanent installation, we recommend the creosoted pressure treated Douglas Fir tanks, as they will last 40 to 50 years with very little maintenance cost and do not require painting.

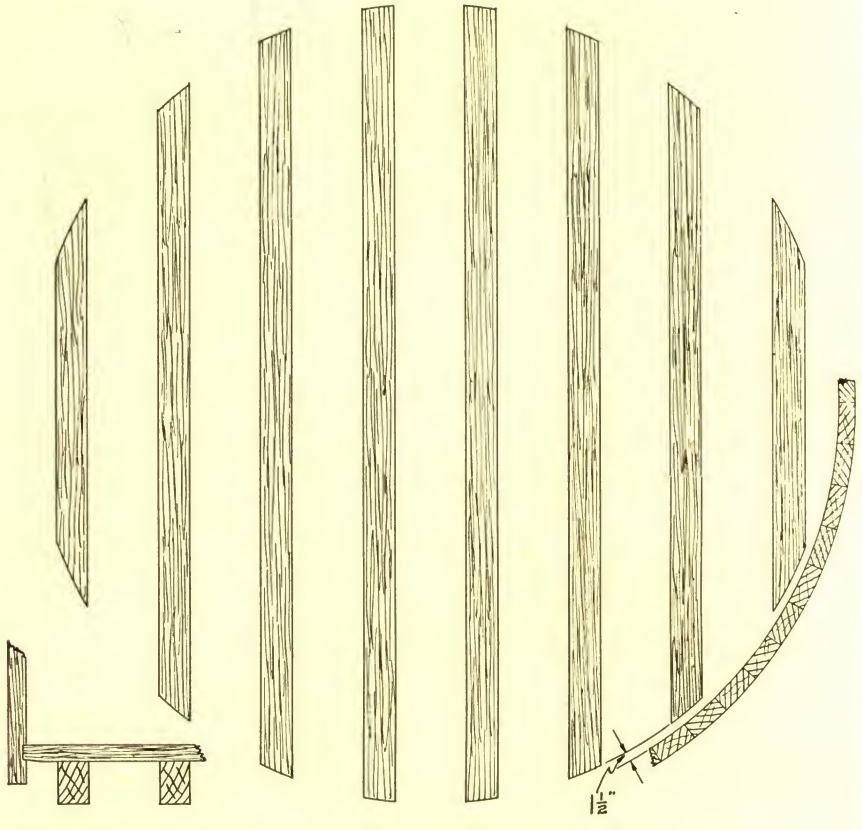
Please let our Engineering Department work with you in the preparation of plans and specifications covering your water storage requirements.

Railroad Tank Fixtures



Size, Inches	Weight, Pounds	List Price	Code Name
6	575	$137.50	Idoli
7	600	170.00	Idyle
8	660	187.00	Ignit
10	1100	232.00	Ignot

Chine Joists



Diameter Tanks Ft. In.	Size of Chine-Joists Inches	Total Weight	List Price	Code Name
4 0	4 x 6	54	$ 1.10	Hazol
5 0	4 x 6	78	1.60	Hazbe
6 0	4 x 6	108	2.20	Haxen
7 0	4 x 6	162	3.30	Haxot
8 0	4 x 6	264	5.30	Haxbo
9 0	4 x 6	276	5.60	Haxte
10 0	4 x 6	336	6.80	Iconi
11 0	4 x 6	408	8.20	Icono
12 0	4 x 6	480	9.60	Ideal
13 8	4 x 6	504	10.10	Ideta
14 0	4 x 6	648	13.00	Idete
16 0	4 x 6	756	15.20	Idilo
18 0	4 x 8	1152	23.10	Idiot
20 0	4 x 8	1344	26.90	Idlen
22 0	4 x 8	1680	33.60	Idlem
24 0	4 x 8	2046	41.00	Idlet

Description of Creosote Process as Applied to Wood Tanks

Staves and bottoms come to the treating plants kiln dried and fully machined so that after treatment they may be fitted together without additional cutting of the treated wood.

Due to the careful jointing and machining, only experienced loaders are used to place the lumber on tram or cylinder cars; every layer being stripped to insure a complete circulation of oil around each piece.

The loaded trams are switched together into a charge, which is sufficient to fill the retort. These retorts are of heavy steel, capable of withstanding high pressure and are equipped with tracks along the bottom upon which the trams roll. When the charge has been pushed into place the large door at the end is closed and bolted securely.

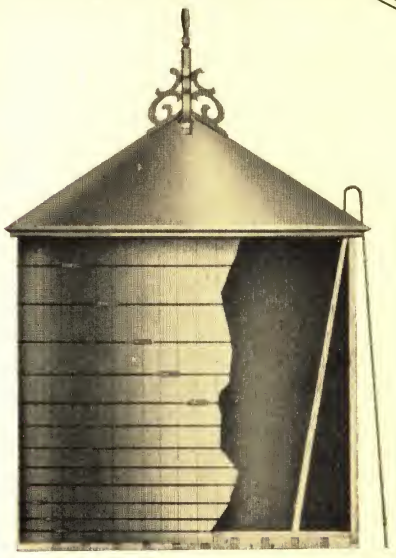
To simply apply a pressure and fill the cells of the wood with creosote would leave a quantity of free oil to eventually work out, drip, contaminate the water and cause many other undesirable features. To eliminate this the cells are first filled with compressed air, then follows the oil pressure. When sufficient oil has been pumped into the wood the cylinder is quickly drained and a vacuum built up therein. This together with the expanding air in the cells completely removes all excess oil so that upon removing the charge the treated wood is clean and dry.

During the treatment the pressure, temperature and vacuums are carefully watched and controlled by elaborate recording instruments in order that the wood may not be injured in the least. By use of a full pressure treatment a deep, uniform penetration is secured. Thus, should any piece, during the shipment or erection, be scarred, it does not expose untreated wood and is still protected against fungi attacks. This treatment is in accordance with the specifications of the American Wood Preservers' Association.

Why Treatment?

The pressure creosote treatment more than doubles the life of a wood tank. Creosoted Douglas Fir tanks will last 40 to 50 years with very little maintenance cost. Creosoted tanks do not require painting as the wood is thoroughly preserved by the creosote oil. Creosoted Douglas Fir tanks are particularly adapted for special purposes, such as railroad tanks and gravity tanks used in connection with sprinkler systems.

"National Quality" Gravity Sprinkler Tanks



Gravity Tanks

For Fire Protection

Constructed and heavily hooped according to specifications recommended by the National Board of Fire Underwriters.

Untreated Tanks

Capacity Gallons	Outside Diameter Ft. In.	Length Stave Feet	Thickness Inches	Approximate Weight Lbs.	List Price	Code Name
10,000	13 4	12	3	5,796	$354.00	Jacke
15,000	14 6	14	3	7,144	435.00	Jackd
20,000	15 6	16	3	8,978	604.50	Jackf
25,000	17 6	16	3	10,450	709.50	Jackn
30,000	18 0	18	3	12,162	849.00	Jackp
40,000	19 6	20	3	15,008	1083.00	Jacob
50,000	23 0	18	3	17,129	1248.00	Jacon
50,000	22 0	20	3	17,830	1308.50	Jacqu

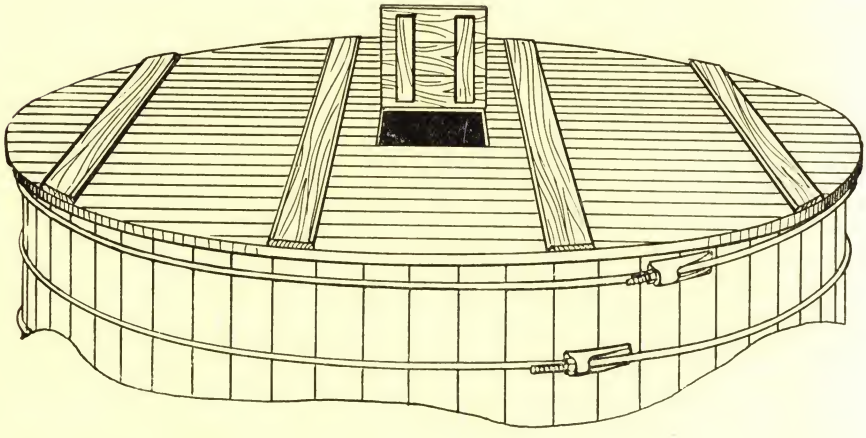
Creosote Pressure Treated Gravity Water Storage Tanks

Capacity Gallons	Outside Diameter Ft. In.	Length Stave Feet	Thickness Inches	Approximate Weight Lbs.	List Price	Code Name
10,000	13 4	12	3	7,251	$473.00	Jacta
15,000	14 6	14	3	8,937	581.50	Jacul
20,000	15 6	16	3	11,138	781.50	Jagge
25,000	17 6	16	3	12,951	914.00	Jaggh
30,000	18 0	18	3	14,993	1081.00	Jaggi
40,000	19 6	20	3	18,410	1361.50	Jamda
50,000	23 0	18	3	20,954	1561.50	Jamas
50,000	22 0	20	3	21,750	1630.00	Janeo

Gravity Water Storage Tank Covers

Diameter of Tank Ft. In.	Weight Lbs.	List Price	Code Name
13 4	1138	$ 85.50	Janga
14 6	1376	99.00	Jangl
15 6	1559	112.00	Janit
17 6	2062	140.00	Janiz
18 0	2146	147.50	Jansh
19 6	2450	162.50	Janti
22 0	3008	197.00	Jantu
23 0	3117	206.00	Janty

Flat Covers



Price List One-Inch Flat Covers

Diameter of Tank Ft.	In.	Approximate Weight	List Price	Code Name
4	0	81	$ 7.50	Jerbo
5	0	114	9.00	Jerfa
6	0	156	11.00	Jerki
6	6	177	12.25	Jervi
7	0	201	13.25	Jeste
8	0	255	16.00	Jestf
9	0	390	19.00	Jetbl
10	0	492	23.50	Jetde
11	0	576	27.75	Jeter
12	0	654	30.00	Jetpu

These flat covers are intended to be used to cover tanks that are erected in buildings and are not designed for outside use where they would be subjected to snow load.

These covers are made from one inch clear Douglas Fir lumber, thoroughly seasoned and milled with a tongue and groove. The number and size of the cleats on top vary with the size of the tank, and these cleats are made from Common Fir lumber. These covers are shipped knocked-down, marked for erection.

All prices subject to discount

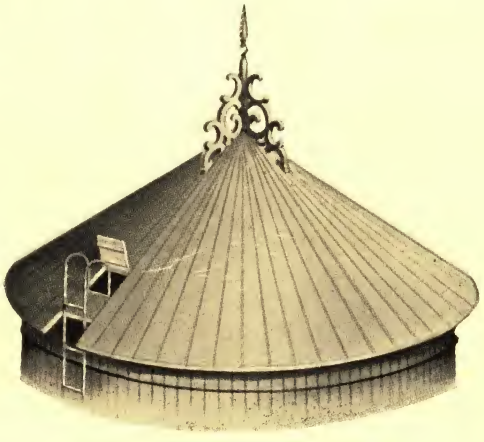
Conical Covers

12-Hip Conical Style

Price List Conical Covers

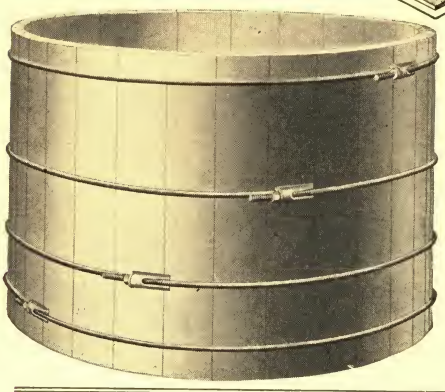
Dia. of Tank Ft.	In.	12-Hip Conical Cover			Plain Conical Cover		
		Weight	List Price	Code Name	Weight	List Price	Code Name
5	1	.....	.....	.....	274	$19.00	Jaspo
6	0	.....	.....	.....	298	22.00	Jatro
6	6	.....	.....	.....	372	23.00	Jaund
8	0	.....	.....	.....	450	29.50	Jaunt
9	0	.....	.....	.....	567	32.50	Javan
10	0	1100	$64.50	Janua	668	40.00	Javel
12	0	1325	72.00	Japet	842	47.00	Javli
14	0	1620	79.50	Jarar	1203	61.50	Jawfa
16	0	1920	91.00	Jarbe	1479	64.50	Jawto
18	0	2225	102.50	Jarde	1844	85.50	Jawoe
20	0	2420	114.00	Jargl	2192	102.00	Jazer
22	0	3050	129.50	Jargo	2454	112.00	Jealo
24	0	3450	147.00	Jarnu	3887	141.50	Jejun
26	0	3800	156.00	Jasha	4173	155.00	Jentl
28	0	4425	181.50	Jasmi	4524	174.00	Jeofa
30	0	4900	194.00	Jaspa	5313	203.00	Jeopa

Good quality prepared roofing will be furnished with Plain Conical Style Cover, or if specified when ordering, we will supply Cedar Shingles.



Plain Conical Style

Prices listed are for the Covers cut at our factory ready to go together but shipped knocked-down.

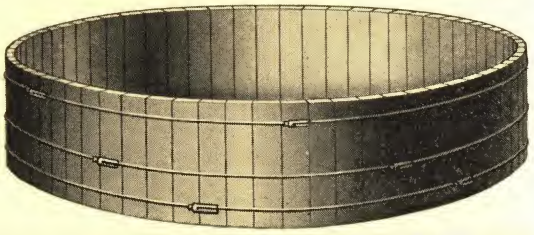


House Tanks

Fitted With Round Steel Hoops

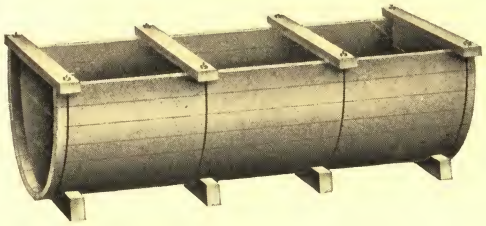
Capacity Gallons	Diameter Ft.	Diameter In.	Height Ft.	Height In.	Approximate Weight	Thickness Inches	List Price	Code Name
60	2	6	2	6	136	2	$14.50	Joggl
80	2	6	3	0	154	2	15.50	Joghi
100	3	0	3	0	185	2	16.50	Johan
150	3	6	3	0	226	2	19.00	Joind
200	4	0	3	0	266	2	22.00	Jolli
250	4	0	4	0	333	2	26.50	Jolly
300	4	3	4	0	357	2	28.00	Jolte
350	4	6	4	0	383	2	29.50	Jonat
400	4	9	4	0	403	2	31.00	Jongl

Round Stock Watering Tanks



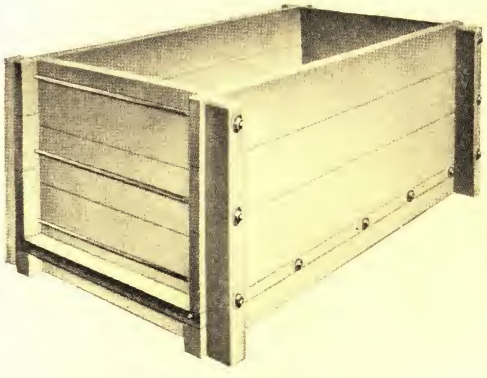
Capacity Gallons	Diameter Feet	Height Ft.	Height In.	Approximate Weight	Thickness Inches	List Price	Code Name
280	6	2	0	358	2	$27.50	Jonqu
375	6	2	6	400	2	30.00	Joera
470	6	3	0	457	2	34.00	Josol
400	7	2	0	444	2	33.00	Josti
530	7	2	6	494	2	36.00	Jounc
665	7	3	0	559	2	40.50	Journ
525	8	2	0	538	2	38.50	Jovia
700	8	2	6	594	2	42.00	Jowle
875	8	3	0	669	2	47.00	Joyan
660	9	2	0	608	2	43.00	Joyfl
880	9	2	6	672	2	47.00	Jubil
1000	9	3	0	755	2	52.50	Jucan
825	10	2	0	710	2	49.50	Judic
1100	10	2	6	780	2	53.50	Jugge
1375	10	3	0	873	2	59.50	Jugle
1200	12	2	0	941	2	64.00	Jugla
1600	12	2	6	1025	2	69.00	Juice
2000	12	3	0	1138	2	73.50	Juise
2200	14	2	6	1295	2	82.50	Jumpe
2750	14	3	0	1426	2	91.50	Junca
2900	16	2	6	1594	2	101.50	Junce
3625	16	3	0	1742	2	112.00	Junso

Half Round Stock Tanks



Manufactured from 2" lumber.

Capacity Gallons	Length Feet	Width Ft.	Width In.	Depth Ft.	Depth In.	Approximate Weight	List Price	Code Name
133	6	3	0	1	6	298	$19.00	Jungl
186	8	3	0	1	6	371	23.50	Junio
239	10	3	0	1	6	462	27.50	Junip
325	10	3	6	1	9	547	32.00	Junke
425	10	4	0	2	0	612	35.00	Junce
292	12	3	0	1	6	540	32.00	Junta
396	12	3	6	1	9	633	36.00	Junto
517	12	4	0	2	0	716	40.00	Jupit
345	14	3	0	1	6	613	35.50	Jupon
468	14	3	6	1	9	764	42.00	Jural
611	14	4	0	2	0	830	45.50	Juras
398	16	3	0	1	6	721	40.50	Jurat
540	16	3	6	1	9	848	46.50	Jurid
705	16	4	0	2	0	947	51.50	Justa
800	18	4	0	2	0	1043	56.00	Justi



Code Name—Jushe

Rectangular Tanks

For Mines
For Plating Works
For Tanneries
For Canneries
For Powder Works
For Chemical Works
For Refrigerating Plants
For Glue Works
For Packing Houses
For Motion Picture Film Developing.

On account of the unlimited variety in the size, construction and requirements of Rectangular Tanks, we do not issue a list of dimensions and prices but will quote special prices upon receipt of specifications giving length, width and depth desired.

In submitting specifications, to avoid misunderstanding, always state if dimensions given are inside or outside measurements.

Truck Tanks

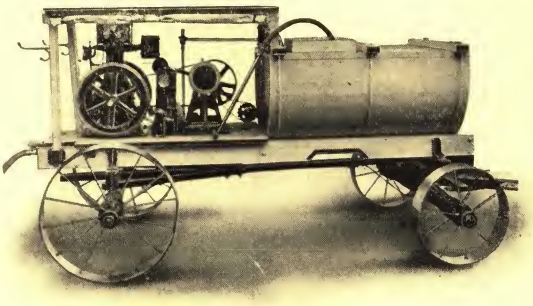
These tanks are constructed of 2-inch material with center splash board, manhole in top, and banded with round, soft steel hoops with malleable iron lugs.

Price List of Tanks Unmounted

Capacity Gallons	Diameter Ft.	Diameter In.	Length Over All, Feet	Thickness Inches	Approximate Weight	List Price	Code Name
200	3	0	6	2	380	$32.00	Juste
250	3	0	7	2	430	35.50	Justi
350	3	4	7	2	504	40.00	Justl
400	3	4	8	2	560	42.50	Jutti
450	3	9	8	2	637	48.50	Jutea
600	4	0	8	2	695	53.00	Jutla
750	4	2	9	2	800	60.00	Jutwi

We are prepared to manufacture any size tank required and will gladly quote prices on other sizes on application. Let our Engineering Department help you solve problems pertaining to the construction of tanks for transporting corrosive liquids.

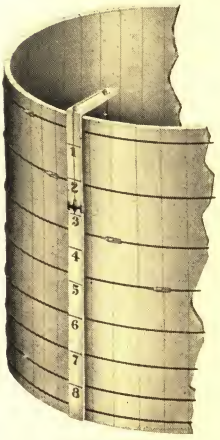
Standard Spray Tanks



Capacity Gallons	Inside Width Inches	Inside Depth Inches	Inside Length Inches	Approximate Weight	List Price	Code Name
100	31½	23¼	45	163	$20.50	Juxyn
100	30	25	35	163	20.50	Jyman
150	36	24½	53	212	26.25	Jynom
150	36	26	44½	212	26.25	Jypen
200	36	29½	53	236	29.00	Jypat
200	36	33½	44½	236	29.00	Kabas
300	39	36	60	297	36.75	Kadia

The prices named are for tanks complete ready to assemble, but do not include manhole, stirrers or foundation sills. We do not manufacture completely equipped Spray Tanks, but are prepared to turn out in quantities Spray Tanks as listed above. Prices on special sizes furnished on application. Write us for prices on stationary Spray Tanks, etc.

Tank Indicators



National Tank Indicator

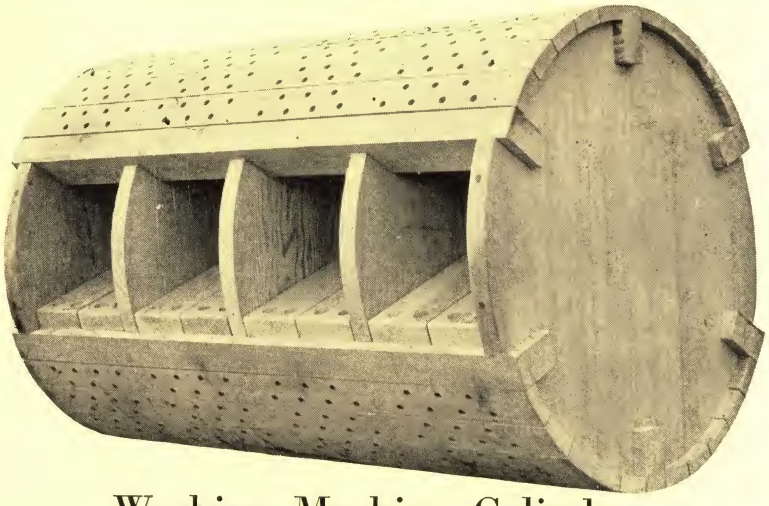
		Code Name
For Tanks 4′ to 10′ high	$2.00	Kafas
For Tanks 12′ to 20′ high	$3.00	Kaffr

These indicators are complete with gauge board marked in feet, having a white background and three-inch black figures and include galvanized steel cable, indicator and pulleys, (no float).

Railroad Tank Indicator

		Code Name
For Tank 14′ high, weight 52 lbs.	$13.00	Kaffl
For Tank 16′ high, weight 56 lbs.	$14.00	Kahav
For Tank 18′ high, weight 60 lbs.	$15.00	Kaheb
For Tank 20′ high, weight 64 lbs.	$16.00	Kakar

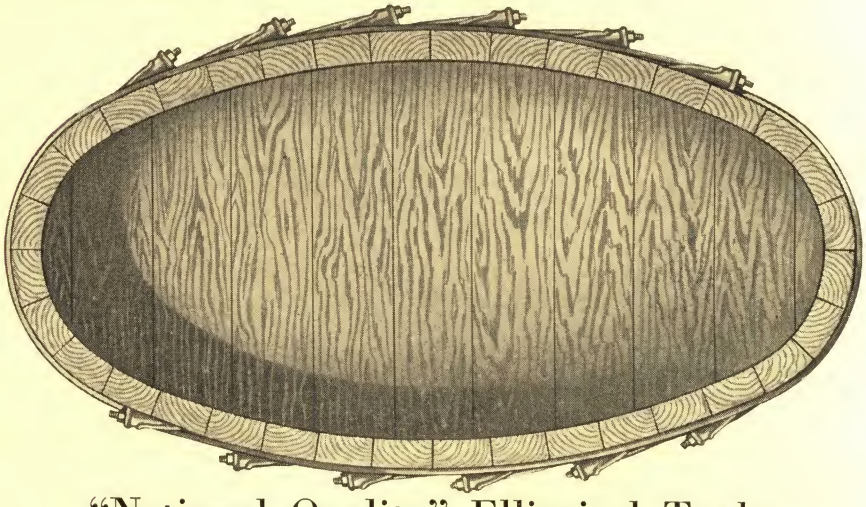
These railroad indicators are complete with gauge board, marked in feet, having a white background and 3-inch black figures and include float, galvanized steel cable, indicator and pulleys.



Washing Machine Cylinders

"National Quality"

We manufacture Cylinders and Casings for all makes of washing machines used in Steam Laundries and Cleaning Establishments. These Cylinders and Casings are manufactured from the finest quality Douglas Fir lumber and are fitted with either Fir or Maple Ribs.

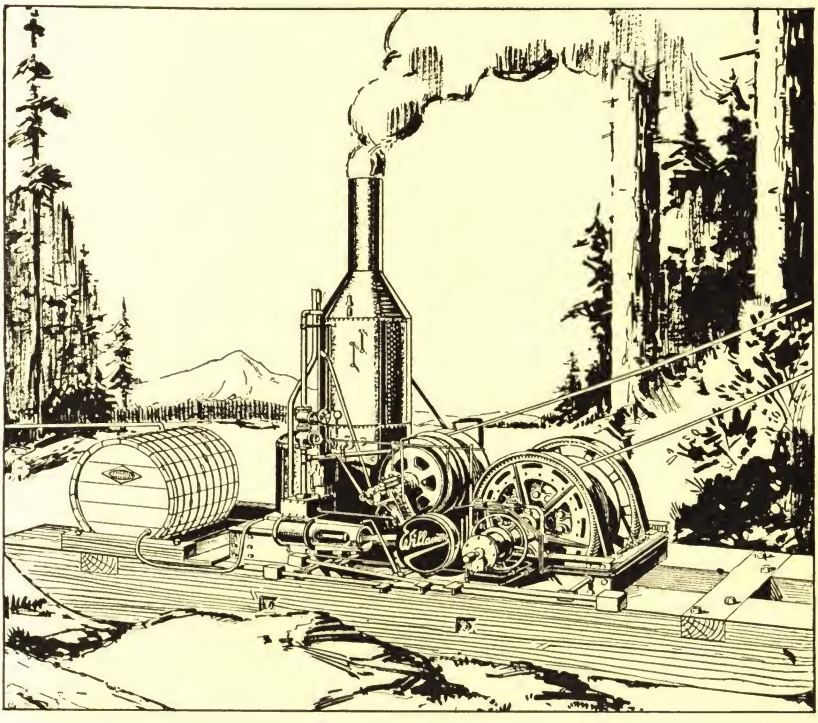


"National Quality" Elliptical Tanks

Elliptical or Oval Wood Tanks are used principally where space does not permit the use of Round Tanks. They are cheaper than Rectangular Tanks and easier to erect. Let us know the dimensions of your available space, and we will draw up specifications on tanks to take care of your particular requirements.

Prices on Application

Logging Engine Tanks



In the great Douglas Fir forests of the West, huge steam engines are used to haul the logs to the railroad spurs. It is for these logging engines that we manufacture these specially designed water storage tanks. They are heavily constructed of the finest quality of materials and built to stand the rough usage that is given all logging equipment.

Capacity Gallons	Outside Diameter Ft. In.	Outside Length Ft. In.	Thickness Inches	Approximate Weight	List Price	Code Name
400	4 0	7 0	3	1022	$67.50	Kalif
850	5 0	8 0	3	1441	91.00	Kaloy
950	5 0	9 0	3	1630	100.00	Kalso
1245	6 0	8 0	3	1867	113.00	Kamac
1425	6 0	9 0	3	2036	123.00	Kamsi

All list prices in this catalog are subject to trade discount.

"National Quality" Chemical Tanks

List Prices "National Quality" Tanks

On the following eleven pages you will find list prices, weights and capacities, for each size of "National Quality" tank from 3′ by 2′ to 49′ by 20′. These figures are for standard water tanks. When tanks are to be used for the storage of a solution that is heavier than water, the design is changed to take care of the increased pressure and the weight of the tank is increased somewhat. Let us know the specific gravity of the solution and we will quote you prices on tanks designed to take care of your particular requirements.

All Prices Subject to Discount

List Prices "National Quality" Tanks

Outside Diam. Feet	Outside Height Feet	Approx. Solution Cap. Tons	Capacity Cubic Feet	Approx. Capacity Gallons	Two-inch Lumber			Three-inch Lumber		
					Approx. Weight	List Price	Code Name	Approx. Weight	List Price	Code Name
3	2	.27	8.7	65	144	$11.00	Malec	.....	.....	.....
	3	.45	14.4	107	186	13.50	Malic	.....	.....	.....
	4	.63	20.1	150	236	17.00	Malig	.....	.....	.....
	5	.81	25.8	193	286	20.00	Malth	.....	.....	.....
4	2	.47	16.6	124	206	15.00	Malva	.....	.....	.....
	3	.85	27.3	204	262	18.50	Malve	.....	.....	.....
	4	1.2	38.1	285	328	22.50	Mamel	.....	.....	.....
	5	1.5	48.8	365	394	27.00	Mamot	.....	.....	.....
	6	1.8	59.5	445	470	32.00	Manac	.....	.....	.....
5	2	.81	26.7	200	282	20.00	Manak	.....	.....	.....
	3	1.4	44.1	330	352	24.00	Manat	.....	.....	.....
	4	1.9	61.4	459	436	30.00	Mapmo	.....	.....	.....
	5	2.4	78.8	589	520	35.00	Marab	.....	.....	.....
	6	3.0	96.1	718	618	42.00	Maran	.....	.....	.....
	7	3.6	113.4	847	702	47.00	Marac	.....	.....	.....
	9	4.7	148.0	1106	870	59.00	Maray	.....	.....	.....
6	2	1.2	39.3	294	360	25.00	Marco	.....	.....	.....
	3	2.0	64.8	485	444	30.00	Maren	.....	.....	.....
	4	2.8	90.3	675	544	36.00	Marga	874	$51.00	Matro
	5	3.6	115.8	866	644	43.00	Marip	1032	60.00	Matur
	6	4.4	141.4	1058	760	51.00	Marjo	1206	70.00	Maudl
	7	5.2	166.9	1248	860	57.00	Marle	1363	79.00	Mauls
	8	6.0	192.4	1439	960	64.00	Marli	1521	89.00	Maund
	9	6.8	217.9	1630	1060	70.00	Marma	1679	98.00	Mauth
	10	7.6	243.4	1820	1160	77.00	Marqu	1837	107.00	Mawki
7	3	2.8	89.6	670	562	37.00	Marro	.....	.....	.....
	4	3.9	124.8	933	678	45.00	Marsh	1082	63.00	Mawor
	5	5.0	160.1	1196	794	53.00	Marsu	1267	73.00	Maxil
	6	6.1	195.3	1460	910	60.00	Marti	1449	84.00	Mayap
	7	7.2	230.6	1725	1026	68.00	Marve	1634	94.00	Maybu
	8	8.3	265.8	1987	1142	75.00	Mascl	1816	105.00	Mayfl
	9	9.4	301.1	2251	1258	83.00	Mascu	2000	116.00	Mayqu
	10	10.3	336.3	2515	1374	90.00	Mashi	2183	126.00	Mazed
8	3	3.7	118.3	884	672	44.00	Masli	.....	.....	.....
	4	5.1	164.8	1233	804	53.00	Mason	1288	74.00	Mazil
	5	6.6	211.4	1580	936	61.00	Masqu	1497	86.00	Meach
	6	8.1	258.8	1935	1068	70.00	Masac	1706	98.00	Meado
	7	9.5	304.5	2278	1200	78.00	Maset	1915	110.00	Mealp
	8	11.0	351.1	2625	1332	87.00	Masta	2124	122.00	Mealy
	9	12.4	397.7	2975	1464	96.00	Maste	2333	135.00	Meand
	10	13.9	444.2	3320	1596	104.00	Masti	2542	147.00	Meatb
	12	16.8	537.4	4015	1860	121.00	Masto	2960	171.00	Meati
	14	19.7	630.5	4760	2124	139.00	Match	3378	195.00	Mecha
	16	22.3	713.6	5360	2388	156.00	Matel	3796	219.00	Mecon
9	3	4.7	151.0	1130	758	50.00	Mater	1220	70.00	Medal
	4	6.6	210.4	1575	906	59.00	Mathe	1453	83.00	Media
	5	8.4	269.9	2018	1054	69.00	Matri	1689	97.00	Medic

List Prices "National Quality" Tanks

Outside Diam. Feet	Outside Height Feet	Approx. Solution Cap. Tons	Capacity Cubic Feet	Approx. Capacity Gallons	Two-inch Lumber			Three-inch Lumber		
					Approx. Weight	List Price	Code Name	Approx. Weight	List Price	Code Name
9	6	10.3	329.3	2462	1202	$78.00	Mefac	1923	$110.00	Navic
	7	12.2	389	2910	1350	88.00	Mefga	2158	124.00	Navig
	8	14.0	448	3350	1498	98.00	Megwa	2392	137.00	Nazar
	9	15.9	508	3800	1646	107.00	Megpa	2628	151.00	Neape
	10	17.7	567	4240	1794	117.00	Mehar	2932	165.00	Nebel
	12	21.4	686	5130	2090	136.00	Melon	3330	192.00	Nebul
	14	25.1	805	6020	2386	156.00	Melow	3799	219.00	Neces
	16	28.8	924	6900	2678	175.00	Melin	4494	258.00	Necka
10	4	8.2	262	1960	1040	67.00	Mendo	1673	95.00	Necro
	5	10.5	336	2510	1204	78.00	Nacar	1933	110.00	Necta
	6	12.7	408	3050	1368	88.00	Nacra	2193	125.00	Negat
	7	15.1	482	3600	1532	99.00	Nacro	2453	141.00	Negle
	8	17.4	556	4160	1696	110.00	Nacse	2714	156.00	Negot
	9	19.7	630	4710	1860	121.00	Nadab	2974	171.00	Negro
	10	22.0	704	5260	2024	131.00	Naevo	3234	186.00	Negus
	12	26.6	852	6370	2352	153.00	Nafel	3755	216.00	Neigh
	14	31.2	1000	7480	2680	174.00	Nageo	4275	246.00	Nemea
	16	35.8	1147	8570	.....	.....	.....	4795	276.00	Nemop
	18	40.5	1295	9670	.....	.....	.....	5330	307.00	Nempn
	20	45.1	1443	10760	.....	.....	.....	5921	343.00	Nenup
11	4	9.9	317	2370	1182	76.00	Naian	1905	108.00	Nevco
	5	12.7	407	3040	1362	88.00	Nailb	2192	125.00	Nepha
	6	15.5	497	3710	1542	99.00	Naive	2477	141.00	Nepet
	7	18.4	587	4390	1722	111.00	Naker	2764	158.00	Neptu
	8	21.2	677	5030	1902	123.00	Namab	3049	174.00	Nerei
	9	23.9	767	5740	2082	135.00	Napif	3334	192.00	Nerva
	10	26.7	857	6410	2262	146.00	Napki	3636	207.00	Nesci
	12	32.4	1037	7760	2622	170.00	Napol	4192	240.00	Neste
	14	38.1	1217	9100	2982	193.00	Napta	4989	285.00	Nestl
	16	43.7	1396	10430	.....	.....	.....	5336	306.00	Netif
	18	49.3	1576	11780	.....	.....	.....	5998	347.00	Neutr
	20	54.9	1756	13130	.....	.....	.....	6659	387.00	Neven
12	4	11.9	381	2850	1340	87.00	Narci	2159	123.00	Newbo
	5	15.2	488	3650	1538	100.00	Nardi	2473	141.00	Newfa
	6	18.6	596	4450	1736	113.00	Narat	2785	160.00	Nexib
	7	22.1	703	5260	1934	126.00	Narti	3100	178.00	Nexus
	8	25.4	811	6060	2132	139.00	Nasal	3413	196.00	Naisf
	9	28.8	918	6860	2330	152.00	Nasic	3727	214.00	Nicen
	10	32.4	1026	7680	2528	165.00	Nasti	4040	232.00	Niche
	12	38.7	1241	9280	2914	191.00	Nasut	4667	269.00	Nicka
	14	45.5	1456	10890	3320	217.00	Natka	5294	305.00	Nicot
	16	52.2	1671	12500	.....	.....	.....	5970	347.00	Nicta
	18	58.9	1886	14100	.....	.....	.....	6713	392.00	Nidif
	20	65.6	2101	15700	.....	.....	.....	7439	437.00	Niell
13	4	14.0	448	3350	1496	96.00	Natro	2415	138.00	Nigel
	5	18.0	575	4300	1710	110.00	Naula	2753	157.00	Nighl
	6	22.0	702	5260	1924	124.00	Nautc	3093	177.00	Nigri
	7	25.9	828	6190	2138	139.00	Nauti	3433	197.00	Nihil
	8	29.8	955	7140	2352	152.00	Navar	3771	216.00	Nilot

List Prices "National Quality" Tanks

Outside Diam. Feet	Outside Height Feet	Approx. Solution Cap. Tons	Capacity Cubic Feet	Approx. Capacity Gallons	Two-inch Lumber			Three-inch Lumber		
					Approx. Weight	List Price	Code Name	Approx. Weight	List Price	Code Name
13	9	33.8	1082	8090	2566	$167.00	Nimbi	4111	$236.00	Notan
	10	37.7	1208	9040	2780	181.00	Ninfo	4449	255.00	Noued
	12	45.6	1462	10930	3208	209.00	Ninsi	5128	294.00	Nouri
	14	53.6	1715	12820	.....	.....	.....	5875	340.00	Novac
	16	61.5	1969	14700	.....	.....	.....	6595	383.00	Nowiz
	18	69.4	2223	16600	.....	.....	.....	7421	435.00	Noxio
	20	77.4	2475	18500	.....	.....	.....	8229	486.00	Noyan
14	4	16.3	522	3900	1681	108.00	Niten	2702	154.00	Nozle
	5	20.9	669	5000	1911	123.00	Nitro	3069	175.00	Nubin
	6	25.5	816	6100	2141	139.00	Nizam	3434	196.00	Nubfe
	7	30.1	964	7200	2371	154.00	Nizey	3798	217.00	Nubil
	8	34.7	1011	8300	2601	169.00	Nociv	4263	239.00	Nucam
	9	39.3	1259	9400	2831	184.00	Nocta	4526	259.00	Nucif
	10	43.9	1406	10500	3061	199.00	Nocti	4891	281.00	Nucle
	12	53.2	1701	12700	3521	229.00	Noctu	5621	323.00	Nudge
	14	62.4	1996	14900	.....	.....	.....	6451	374.00	Nuisa
	16	71.6	2291	17100	.....	.....	.....	7260	423.00	Nulap
	18	80.8	2585	19300	.....	.....	.....	8171	481.00	Nunch
	20	90.0	2880	21500	.....	.....	.....	9047	536.00	Nunci
15	4	17.5	561	4200	1852	119.00	Nodal	3199	181.00	Nupha
	5	22.7	726	5400	2088	135.00	Noema	3361	191.00	Nupso
	6	28.	892	6600	2333	150.00	Noeti	3748	214.00	Nurte
	7	33.	1057	7900	2576	166.00	Noian	4135	236.00	Nutan
	8	38.	1222	9100	2820	182.00	Noiou	4522	259.00	Nutbo
	9	43.	1387	10400	3064	198.00	Noise	4909	281.00	Nutri
	10	49.	1552	11600	3308	214.00	Nolit	5296	303.00	Nuxvo
	12	59.	1882	14100	.....	.....	.....	6070	348.00	Nuzle
	14	69.	2213	16500	.....	.....	.....	6970	403.00	Nyast
	16	79.	2543	19000	.....	.....	.....	7962	467.00	Nylga
	18	90.	2873	21500	.....	.....	.....	9051	532.00	Nymph
	20	100.	3203	24000	.....	.....	.....	9756	578.00	Nysel
16	4	20.	642	4800	2023	130.00	Nolet	3266	185.00	Nysut
	5	26.	820	6100	2284	147.00	Nomad	3680	209.00	Nysan
	6	32.	1009	7500	2533	164.00	Nonac	4092	233.00	Nysqu
	7	37.	1198	9000	2803	181.00	Nonag	4505	257.00	Nyzor
	8	43.	1386	10400	3063	198.00	Nonar	4917	281.00	Nyzif
	9	49.	1575	11800	3323	215.00	Nonch	5328	304.00	Nyzph
	10	55.	1764	13200	3604	233.00	Nonrs	5763	330.00	Oafis
	12	67.	2151	16000	4124	267.00	Nolog	6588	378.00	Oaflo
	14	79.	2528	18500	.....	.....	.....	7590	440.00	Oagtl
	16	91.	2906	21900	.....	.....	.....	8570	501.00	Oagsi
	18	102.	3283	24500	.....	.....	.....	9559	563.00	Oagou
	20	114.	3660	27300	.....	.....	.....	10607	630.00	Oagun
17	4	23.	736	5500	2216	143.00	Nopal	3582	204.00	Oarsm
	5	30.	952	7100	2496	161.00	Nosci	4022	229.00	Oasis
	6	37.	1169	8700	2774	179.00	Noseb	4463	255.00	Oatca
	7	43.	1385	10300	3052	197.00	Nosga	4903	280.00	Oatha
	8	50.	1601	12000	3330	216.00	Nosog	5343	306.00	Oatma
	9	56.	1818	13600	.....	.....	.....	5783	332.00	Obamb

List Prices "National Quality" Tanks

Outside Diam. Feet	Outside Height Feet	Approx. Solution Cap. Tons	Capacity Cubic Feet	Approx. Capacity Gallons	Two-inch Lumber			Three-inch Lumber		
					Approx. Weight	List Price	Code Name	Approx. Weight	List Price	Code Name
17	10	64	2034	15200	.....	.....	.....	6248	$359.00	Ogoda
	12	75	2467	18400	.....	.....	.....	7200	416.00	Ognat
	14	91	2900	21700	.....	.....	.....	8249	482.00	Ogrei
	16	105	3333	24900	.....	.....	.....	9315	549.00	Ogyni
	18	121	3766	27900	.....	.....	.....	10442	622.00	Oilcl
	20	136	4200	31200	.....	.....	.....	11568	695.00	Oilft
18	4	26	827	6200	2412	$155.00	Obdor	3903	222.00	Oilno
	5	33	1071	8000	2706	174.00	Obduc	4369	249.00	Oilst
	6	41	1314	9800	3000	193.00	Obdur	4834	275.00	Okrom
	7	49	1558	11600	3294	213.00	Obeah	5299	302.00	Oldfa
	8	56	1801	13500	3588	232.00	Obeli	5772	339.00	Oleas
	9	64	2044	15300	.....	.....	.....	6231	356.00	Olfac
	10	72	2288	17100	.....	.....	.....	6724	385.00	Oliot
	12	87	2773	20700	.....	.....	.....	7811	453.00	Oliva
	14	103	3260	24400	.....	.....	.....	8925	523.00	Ologr
	16	118	3747	28000	.....	.....	.....	10049	593.00	Omagr
	18	134	4233	32300	.....	.....	.....	11243	671.00	Ombre
	20	150	4720	36600	.....	.....	.....	12436	748.00	Omele
19	4	29	924	6900	2615	168.00	Obequ	4233	240.00	Omina
	5	37	1196	8900	2925	188.00	Obita	4724	268.00	Ominz
	6	46	1467	11000	3235	208.00	Objel	5216	297.00	Ominq
	7	54	1739	13000	3545	228.00	Oblec	5707	325.00	Omins
	8	63	2011	15000	3854	268.00	Octar	6199	353.00	Omint
	9	71	2282	17000	.....	.....	.....	6717	384.00	Omist
	10	80	2554	19100	.....	.....	.....	7236	413.00	Omnip
	12	97	3098	23100	.....	.....	.....	8358	484.00	Ompha
	14	114	3641	27200	.....	.....	.....	9526	557.00	Onagr
	16	131	4184	31300	.....	.....	.....	10782	638.00	Oncid
	18	148	4728	35300	.....	.....	.....	12038	718.00	Oncot
	20	165	5272	39300	.....	.....	.....	13377	806.00	Oneir
20	4	32	1026	7700	2820	180.00	Odeum	4575	259.00	Onero
	5	41	1328	10000	3146	202.00	Odica	5093	289.00	Oneya
	6	51	1629	12100	3472	223.00	Odont	5609	319.00	Onkit
	7	60	1931	14400	3798	244.00	Odora	6125	348.00	Onoma
	8	70	2233	16700	.....	.....	.....	6643	378.00	Onste
	9	79	2534	18900	.....	.....	.....	7187	410.00	Ontol
	10	88	2836	21200	.....	.....	.....	7733	443.00	Onwar
	12	107	3440	25700	.....	.....	.....	8964	519.00	Opaco
	14	128	4043	33200	.....	.....	.....	10214	598.00	Opali
	16	146	4646	34700	.....	.....	.....	11532	686.00	Openb
	18	164	5250	39200	.....	.....	.....	12850	767.00	Ophic
	20	182	5853	43700	.....	.....	.....	14245	859.00	Opiat
21	4	35	1133	8500	3035	194.00	Odyle	4930	278.00	Opina
	5	46	1466	11000	3377	216.00	Ofoci	5473	310.00	Opinf
	6	56	1800	13500	3719	238.00	Ofing	6016	341.00	Opltr
	7	67	2133	16000	4051	261.00	Ofwar	6558	372.00	Opori
	8	77	2466	18400	.....	.....	.....	7101	404.00	Opida
	9	87	2800	20900	.....	.....	.....	7673	437.00	Opose
	10	98	3133	23400	.....	.....	.....	8331	479.00	Opugn
	12	119	3800	28400	.....	.....	.....	9620	559.00	Optic

List Prices "National Quality" Tanks

Outside Diam. Feet	Outside Height Feet	Approx. Solution Cap. Tons	Capacity Cubic Feet	Approx. Capacity Gallons	Two-inch Lumber			Three-inch Lumber		
					Approx. Weight	List Price	Code Name	Approx. Weight	List Price	Code Name
21	14	139	4466	33400	.....	.....	.....	10921	$640.00	Orati
	16	160	5133	38400	.....	.....	.....	12302	729.00	Orbed
	18	181	5800	43400	.....	.....	.....	13761	824.00	Orbic
	20	202	6466	48300	.....	.....	.....	15215	918.00	Orche
22	4	39	1246	9300	3256	$207.00	Opusc	5296	299.00	Orcha
	5	50	1612	12000	3614	231.00	Oracl	5866	332.00	Ordel
	6	62	1979	14800	3972	254.00	Orang	6433	364.00	Ordin
	7	73	2345	17500	.....	.....	.....	7003	397.00	Orich
	8	84	2712	20300	.....	.....	.....	7622	436.00	Orion
	9	95	3078	23000	.....	.....	.....	8229	470.00	Orlet
	10	107	3444	25800	.....	.....	.....	8827	506.00	Orlop
	12	130	4177	31200	.....	.....	.....	10203	592.00	Ornam
	14	153	4910	36700	.....	.....	.....	11482	682.00	Ornit
	16	176	5643	42200	.....	.....	.....	13089	776.00	Orogr
	18	199	6376	47700	.....	.....	.....	14659	878.00	Orotu
	20	222	7109	52200	.....	.....	.....	16223	982.00	Orpha
23	4	42	1364	10200	.....	.....	.....	5687	321.00	Orpin
	5	55	1765	13200	.....	.....	.....	6283	356.00	Orerc
	6	68	2166	16200	.....	.....	.....	6879	390.00	Orthi
	7	80	2567	19200	.....	.....	.....	7475	425.00	Ortol
	8	93	2969	22200	.....	.....	.....	8071	459.00	Ortyx
	9	105	3370	25200	.....	.....	.....	8733	499.00	Orval
	10	118	3771	28200	.....	.....	.....	9495	548.00	Oryza
	12	143	4573	34200	.....	.....	.....	10939	639.00	Oscil
	14	168	5375	40200	.....	.....	.....	12375	730.00	Osier
	16	193	6178	46200	.....	.....	.....	13989	836.00	Osmaz
	18	218	6980	52200	.....	.....	.....	15603	942.00	Osmiu
	20	243	7782	58200	.....	.....	.....	17307	1056.00	Ospre
24	4	46	1487	11100	.....	.....	.....	6078	343.00	Osten
	5	60	1924	14400	.....	.....	.....	6701	379.00	Ostra
	6	74	2361	17600	.....	.....	.....	7322	415.00	Otios
	7	87	2799	20900	.....	.....	.....	7944	451.00	Otoma
	8	101	3236	24200	.....	.....	.....	8733	491.00	Oubli
	9	114	3673	27600	.....	.....	.....	9299	531.00	Ouchn
	10	128	4111	31400	.....	.....	.....	10045	582.00	Ouphe
	12	156	4986	37300	.....	.....	.....	11550	674.00	Ourse
	14	183	5861	43900	.....	.....	.....	13139	776.00	Ouste
	16	210	6736	50200	.....	.....	.....	14818	886.00	Outar
	18	238	7611	56900	.....	.....	.....	16568	1004.00	Outbo
	20	265	8485	63400	.....	.....	.....	18360	1123.00	Outbu
25	4	50	1616	12100	.....	.....	.....	6483	365.00	Ouzel
	5	65	2091	15600	.....	.....	.....	7130	402.00	Ovali
	6	80	2567	19100	.....	.....	.....	7778	440.00	Ovalb
	7	95	3042	22700	.....	.....	.....	8425	477.00	Ovato
	8	110	3517	26300	.....	.....	.....	9142	521.00	Overt
	9	125	3992	29900	.....	.....	.....	9828	561.00	Overl
	10	139	4468	33400	.....	.....	.....	10611	610.00	Ovuli
	12	169	5418	40500	.....	.....	.....	12371	716.00	Owche
	14	199	6369	47600	.....	.....	.....	13920	823.00	Oweni

List Prices "National Quality" Tanks

Outside Diam. Feet	Outside Height Feet	Approx. Solution Cap. Tons	Capacity Cubic Feet	Approx. Capacity Gallons	Two-inch Lumber			Three-inch Lumber		
					Approx. Weight	List Price	Code Name	Approx. Weight	List Price	Code Name
25	16	229	7319	54700	.....	.....	.....	15664	$937.00	Owlet
	18	258	8270	61800	.....	.....	.....	17504	1059.00	Owliu
	20	288	9221	69000	.....	.....	.....	19343	1183.00	Oxali
26	4	55	1750	13100	.....	.....	.....	6897	390.00	Oxami
	5	71	2265	16900	.....	.....	.....	7571	427.00	Oxbow
	6	87	2779	20800	.....	.....	.....	8242	466.00	Oxgoa
	7	103	3294	24600	.....	.....	.....	8917	505.00	Oxhea
	8	120	3809	28500	.....	.....	.....	9660	547.00	Oxida
	9	134	4324	32300	.....	.....	.....	10478	601.00	Oxipn
	10	151	4838	36200	.....	.....	.....	11293	652.00	Oxyer
	12	183	5868	43900	.....	.....	.....	12907	753.00	Oxych
	14	215	6898	51600	.....	.....	.....	14718	872.00	Oxyme
	16	248	7927	59200	.....	.....	.....	16527	990.00	Oxymu
	18	280	8957	67000	.....	.....	.....	18434	1116.00	Oxyop
	20	312	9986	74700	.....	.....	.....	20440	1252.00	Oxyri
27	4	59	1889	14100	.....	.....	.....	7324	411.00	Oylet
	5	76	2445	18300	.....	.....	.....	8023	452.00	Oyste
	6	94	3001	22400	.....	.....	.....	8721	492.00	Ozona
	7	111	3557	26600	.....	.....	.....	9420	532.00	Pabul
	8	128	4112	30700	.....	.....	.....	10202	580.00	Pacat
	9	146	4668	34900	.....	.....	.....	11139	632.00	Pacer
	10	163	5224	39200	.....	.....	.....	11885	685.00	Pachy
	12	198	6335	47400	.....	.....	.....	13658	798.00	Packe
	14	233	7447	55700	.....	.....	.....	15553	921.00	Packw
	16	267	8558	64000	.....	.....	.....	17408	1043.00	Padow
	18	302	9670	72300	.....	.....	.....	19385	1174.00	Pagac
	20	337	10781	80600	.....	.....	.....	21562	1323.00	Pagel
28	4	63	2034	15200	.....	.....	.....	7776	437.00	Pagea
	5	82	2632	19700	.....	.....	.....	8501	479.00	Pagin
	6	101	3231	24200	.....	.....	.....	9228	521.00	Paide
	7	119	3829	28600	.....	.....	.....	9995	567.00	Pailb
	8	138	4427	33200	.....	.....	.....	10880	623.00	Paina
	9	157	5026	37800	.....	.....	.....	11768	679.00	Paire
	10	176	5624	42400	.....	.....	.....	12641	733.00	Paise
	12	213	6820	51000	.....	.....	.....	14497	853.00	Pakfo
	14	251	8017	60000	.....	.....	.....	16353	973.00	Palac
	16	288	9214	69000	.....	.....	.....	18429	1112.00	Palan
	18	325	10410	78000	.....	.....	.....	20606	1249.00	Palat
	20	362	11607	87000	.....	.....	.....	22786	1407.00	Paleo
29	4	68	2184	16300	.....	.....	.....	8214	462.00	Palmi
	5	88	2827	21100	.....	.....	.....	8964	509.00	Palme
	6	108	3469	25900	.....	.....	.....	9711	548.00	Palpa
	7	128	4111	30700	.....	.....	.....	10540	598.00	Panab
	8	149	4754	35500	.....	.....	.....	11413	652.00	Pande
	9	169	5396	41100	.....	.....	.....	12326	710.00	Panhe
	10	189	6039	45200	.....	.....	.....	13226	766.00	Panop
	12	229	7324	54800	.....	.....	.....	15137	889.00	Panso
	14	269	8608	64200	.....	.....	.....	17160	1022.00	Panst
	16	309	9893	73800	.....	.....	.....	19294	1165.00	Papyo

List Prices "National Quality" Tanks

Outside Diam. Feet	Outside Height Feet	Approx. Solution Cap. Tons	Capacity Cubic Feet	Approx. Capacity Gallons	Two-inch Lumber			Three-inch Lumber		
					Approx. Weight	List Price	Code Name	Approx. Weight	List Price	Code Name
29	18	346	11178	83500	.....	.....	.....	21539	$1317.00	Paque
	20	389	12463	93100	.....	.....	.....	23894	1479.00	Parab
30	4	73	2340	17500	.....	.....	.....	8677	487.00	Parad
	5	95	3028	21600	.....	.....	.....	9452	531.00	Paral
	6	116	3716	78800	.....	.....	.....	10226	576.00	Param
	7	138	4404	32900	.....	.....	.....	11044	625.00	Paran
	8	159	5092	38000	.....	.....	.....	12110	695.00	Parso
	9	181	5780	43200	.....	.....	.....	12927	743.00	Parch
	10	202	6468	48300	.....	.....	.....	13838	801.00	Paira
	12	245	7845	58600	.....	.....	.....	15944	938.00	Parni
	14	288	9221	69000	.....	.....	.....	18032	1075.00	Parit
	16	331	10597	79200	.....	.....	.....	20234	1222.00	Parqu
	18	374	11974	89600	.....	.....	.....	22550	1379.00	Parot
	20	417	13350	100000	.....	.....	.....	24980	1546.00	Parsn
31	4	78	2500	18700	.....	.....	.....	9154	513.00	Parta
	5	101	3236	24100	.....	.....	.....	9953	559.00	Parth
	6	124	3971	29700	.....	.....	.....	10754	606.00	Parti
	7	147	4707	35600	.....	.....	.....	11726	667.00	Partl
	8	170	5442	40700	.....	.....	.....	12568	716.00	Partr
	9	193	6178	46100	.....	.....	.....	13658	788.00	Parvi
	10	216	6913	51600	.....	.....	.....	14616	848.00	Pasha
	12	264	8384	62600	.....	.....	.....	16652	978.00	Pasqu
	14	308	9855	73600	.....	.....	.....	18900	1130.00	Pasti
	16	353	11325	84700	.....	.....	.....	21193	1281.00	Patac
	18	400	12796	95700	.....	.....	.....	23697	1453.00	Patch
	20	444	14267	106700	.....	.....	.....	26201	1624.00	Patel
32	4	83	2667	19900	.....	.....	.....	9642	540.00	Pathi
	5	108	3451	25800	.....	.....	.....	10446	587.00	Patho
	6	132	4235	31600	.....	.....	.....	11293	635.00	Rabal
	7	157	5019	37500	.....	.....	.....	12294	698.00	Racke
	8	181	5804	43400	.....	.....	.....	13295	761.00	Rackl
	9	205	6588	49300	.....	.....	.....	14285	823.00	Radea
	10	230	7372	55100	.....	.....	.....	15274	885.00	Rafis
	12	279	8941	65900	.....	.....	.....	17492	1030.00	Rafte
	14	325	10409	77800	.....	.....	.....	19833	1185.00	Ragio
	16	378	12078	90100	.....	.....	.....	22160	1339.00	Railj
	18	426	13646	101800	.....	.....	.....	24747	1517.00	Raime
	20	475	15215	113700	.....	.....	.....	27446	1704.00	Raisa
33	4	89	2838	21200	.....	.....	.....	10142	568.00	Rajpo
	5	114	3673	27400	.....	.....	.....	10994	617.00	Rakes
	6	141	4507	33600	.....	.....	.....	11888	670.00	Ramea
	7	167	5342	40000	.....	.....	.....	12875	730.00	Rampa
	8	193	6177	46200	.....	.....	.....	13905	795.00	Ramso
	9	219	7011	52400	.....	.....	.....	14925	859.00	Ramul
	10	245	7846	57600	.....	.....	.....	16066	933.00	Rauci
	12	297	9515	71200	.....	.....	.....	18227	1071.00	Ranco
	14	350	11185	83600	.....	.....	.....	20633	1231.00	Raniu
	16	402	12854	96000	.....	.....	.....	23163	1401.00	Rankl
	18	454	14524	107500	.....	.....	.....	25816	1583.00	Ransa
	20	506	16193	121200	.....	.....	.....	28592	1775.00	Ranti

List Prices "National Quality" Tanks

Outside Diam. Feet	Outside Height Feet	Approx. Solution Cap. Tons	Capacity Cubic Feet	Approx. Capacity Gallons	Two-inch Lumber			Three-inch Lumber		
					Approx. Weight	List Price	Code Name	Approx. Weight	List Price	Code Name
34	4	94	3015	22500	.....	.....	.....	10672	$ 598.00	Ranun
	5	122	3901	29200	.....	.....	.....	11550	648.00	Rapac
	6	150	4788	35800	.....	.....	.....	12476	703.00	Rapew
	7	177	5675	42400	.....	.....	.....	13499	767.00	Raphe
	8	205	6561	49000	.....	.....	.....	14570	834.00	Rapor
	9	233	7448	55700	.....	.....	.....	15715	912.00	Rarel
	10	260	8335	62300	.....	.....	.....	16834	979.00	Rasur
	12	316	10108	75600	.....	.....	.....	19185	1134.00	Ratab
	14	372	11882	88400	.....	.....	.....	21689	1301.00	Ratea
	16	427	13655	102200	.....	.....	.....	24322	1480.00	Rathr
	18	482	15428	115400	.....	.....	.....	27084	1670.00	Ratio
	20	538	17202	128600	.....	.....	.....	30108	1883.00	Ratle
35	4	100	3197	23900	.....	.....	.....	11194	626.00	Ravel
	5	129	4137	30900	.....	.....	.....	12099	679.00	Ravis
	6	158	5077	38000	.....	.....	.....	13198	748.00	Rawbo
	7	188	6017	45000	.....	.....	.....	14103	800.00	Rayah
	8	217	6958	52000	.....	.....	.....	15202	869.00	Razel
	9	243	7898	59000	.....	.....	.....	16421	949.00	Reach
	10	276	8838	66000	.....	.....	.....	17506	1017.00	React
	12	335	10719	73000	.....	.....	.....	20078	1189.00	Reade
	14	393	12599	81600	.....	.....	.....	22649	1360.00	Reali
	16	452	14480	108200	.....	.....	.....	25353	1543.00	Reani
	18	510	16360	122400	.....	.....	.....	28323	1750.00	Rearl
	20	571	18241	136500	.....	.....	.....	31294	1956.00	Reaso
36	4	106	3384	25300	.....	.....	.....	11709	655.00	Reave
	5	137	4380	32800	.....	.....	.....	12643	708.00	Reawa
	6	168	5375	40200	.....	.....	.....	13717	775.00	Rebab
	7	199	6370	47700	.....	.....	.....	14847	846.00	Rebel
	8	230	7366	55100	.....	.....	.....	15963	907.00	Reblo
	9	261	8361	62500	.....	.....	.....	17078	986.00	Rebcu
	10	292	9356	70100	.....	.....	.....	18331	1068.00	Rebuc
	12	354	11347	85000	.....	.....	.....	20835	1232.00	Rebus
	14	416	13338	99900	.....	.....	.....	23610	1419.00	Recad
	16	478	15329	114800	.....	.....	.....	26386	1607.00	Recap
	18	541	17320	129700	.....	.....	.....	29433	1820.00	Recit
	20	603	19310	144500	.....	.....	.....	32616	2041.00	Recli
37	4	111	3577	26700	.....	.....	.....	12278	686.00	Recog
	5	144	4629	34600	.....	.....	.....	13232	741.00	Recol
	6	177	5681	42500	.....	.....	.....	14340	810.00	Recou
	7	210	6733	50400	.....	.....	.....	15499	882.00	Recre
	8	243	7785	57300	.....	.....	.....	16645	954.00	Recri
	9	276	8838	65100	.....	.....	.....	17787	1025.00	Recti
	10	308	9890	72900	.....	.....	.....	19075	1110.00	Recul
	12	374	11994	89800	.....	.....	.....	21783	1290.00	Recup
	14	440	14097	105500	.....	.....	.....	24491	1470.00	Redan
	16	506	16201	122000	.....	.....	.....	27476	1674.00	Redin
	18	572	18305	136800	.....	.....	.....	30596	1891.00	Redub
	20	638	20410	153300	.....	.....	.....	34004	2132.00	Sabae

List Prices "National Quality" Tanks

Outside Diam. Feet	Outside Height Feet	Approx. Solution Cap. Tons	Capacity Cubic Feet	Approx. Capacity Gallons	Two-inch Lumber			Three-inch Lumber		
					Approx. Weight	List Price	Code Name	Approx. Weight	List Price	Code Name
38	4	118	3775	28200	.....	.....	.....	12840	$ 717.00	Sabel
	5	153	4886	36600	.....	.....	.....	13820	774.00	Sabul
	6	187	5996	44800	.....	.....	.....	14957	844.00	Sacha
	7	222	7106	53100	.....	.....	.....	16146	918.00	Sache
	8	257	8217	61400	.....	.....	.....	17321	992.00	Sackb
	9	292	9327	69700	.....	.....	.....	18777	1090.00	Sadan
	10	325	10437	78000	.....	.....	.....	19955	1164.00	Safeg
	12	395	12658	89800	.....	.....	.....	22585	1335.00	Saflo
	14	465	14879	111400	.....	.....	.....	25507	1532.00	Sagac
	16	534	17100	127800	.....	.....	.....	28568	1741.00	Sagum
	18	604	19320	144500	.....	.....	.....	31911	1975.00	Saiky
	20	674	21541	161000	.....	.....	.....	35256	2210.00	Salqu
39	4	124	3979	29700	.....	.....	.....	13424	750.00	Saloa
	5	161	5149	38600	.....	.....	.....	14434	809.00	Salme
	6	197	6319	47300	.....	.....	.....	15607	881.00	Salog
	7	231	7489	56000	.....	.....	.....	16821	956.00	Salta
	8	270	8660	64900	.....	.....	.....	18048	1034.00	Salmi
	9	310	9830	73700	.....	.....	.....	19408	1124.00	Salrk
	10	349	11000	82100	.....	.....	.....	20771	1213.00	Salva
	12	427	13440	100500	.....	.....	.....	23639	1405.00	Salvo
	14	493	15781	117800	.....	.....	.....	26665	1610.00	Samia
	16	563	18121	135400	.....	.....	.....	29837	1828.00	Sampo
	18	639	20462	153000	.....	.....	.....	33303	2073.00	Samph
	20	714	22802	170500	.....	.....	.....	36920	2330.00	Sanbe
40	4	131	4188	31300	.....	.....	.....	14009	782.00	Sanda
	5	169	5419	40500	.....	.....	.....	15043	842.00	Sande
	6	204	6651	49600	.....	.....	.....	16246	916.00	Sandi
	7	246	7882	58900	.....	.....	.....	17504	995.00	Sangu
	8	285	9114	68200	.....	.....	.....	18896	1087.00	Sansc
	9	323	10346	77100	.....	.....	.....	20140	1165.00	Sapad
	10	362	11577	86800	.....	.....	.....	21535	1254.00	Sapor
	12	439	14041	105000	.....	.....	.....	24475	1452.00	Sapot
	14	518	16504	123400	.....	.....	.....	27719	1675.00	Saphi
	16	591	18967	141700	.....	.....	.....	30964	1898.00	Sapro
	18	669	21430	160300	.....	.....	.....	34513	2147.00	Sarco
	20	746	23894	178500	.....	.....	.....	38213	2411.00	Sarda
41	4	136	4402	32900	.....	.....	.....	14607	815.00	Sarga
	5	177	5696	42600	.....	.....	.....	15782	886.00	Sarig
	6	218	6991	52300	.....	.....	.....	16898	952.00	Sarki
	7	259	8286	62000	.....	.....	.....	18187	1033.00	Sasho
	8	299	9580	71600	.....	.....	.....	19612	1127.00	Sasfr
	9	339	10875	81200	.....	.....	.....	21041	1220.00	Sastr
	10	380	12169	91000	.....	.....	.....	22467	1313.00	Satia
	12	461	14759	110400	.....	.....	.....	25480	1514.00	Satis
	14	542	17348	129600	.....	.....	.....	28794	1741.00	Sativ
	16	623	19937	149000	.....	.....	.....	32113	1969.00	Satyr
	18	703	22526	168500	.....	.....	.....	35897	2238.00	Saucy
	20	784	25116	188000	.....	.....	.....	39680	2506.00	Sauer

List Prices "National Quality" Tanks

Outside Diam. Feet	Outside Height Feet	Approx. Solution Cap. Tons	Capacity Cubic Feet	Approx. Capacity Gallons	Two-inch Lumber			Three-inch Lumber		
					Approx. Weight	List Price	Code Name	Approx. Weight	List Price	Code Name
42	4	144	4621	34600	.....	.....	.....	15203	$ 799.00	Sauro
	5	187	5980	44700	.....	.....	.....	16403	871.00	Savac
	6	230	7340	54900	.....	.....	.....	17716	954.00	Savoy
	7	272	8699	65100	.....	.....	.....	19015	1083.00	Sawar
	8	314	10058	75200	.....	.....	.....	20312	1117.00	Sawfl
	9	357	11417	85400	.....	.....	.....	21769	1212.00	Seaba
	10	398	12776	95600	.....	.....	.....	23224	1307.00	Seabe
	12	484	15495	115800	.....	.....	.....	26452	1525.00	Seaca
	14	569	18213	136100	.....	.....	.....	29681	1743.00	Seacu
	16	654	20931	156500	.....	.....	.....	33225	1989.00	Seade
	18	739	23649	176900	.....	.....	.....	37085	2263.00	Seael
	20	823	26368	197200	.....	.....	.....	41103	2549.00	Seafa
43	4	151	4846	36200	.....	.....	.....	15821	882.00	Seali
	5	196	6271	46800	.....	.....	.....	17050	956.00	Seame
	6	243	7797	58200	.....	.....	.....	18387	1041.00	Seams
	7	289	9222	68900	.....	.....	.....	19704	1123.00	Seanc
	8	333	10647	79600	.....	.....	.....	21051	1207.00	Seaph
	9	378	12073	90100	.....	.....	.....	22538	1304.00	Seapu
	10	422	13498	100800	.....	.....	.....	24188	1415.00	Searc
	12	511	16348	122200	.....	.....	.....	27325	1624.00	Seare
	14	600	19199	143500	.....	.....	.....	30791	1860.00	Seaso
	16	689	22050	165400	.....	.....	.....	34410	2111.00	Secan
	18	778	24900	186200	.....	.....	.....	38371	2390.00	Seced
	20	867	27751	207400	.....	.....	.....	42451	2683.00	Seces
44	4	158	5076	37900	.....	.....	.....	16458	917.00	Seclu
	5	205	6569	49100	.....	.....	.....	17713	993.00	Secon
	6	252	8062	60300	.....	.....	.....	19085	1079.00	Secre
	7	298	9555	71400	.....	.....	.....	20441	1164.00	Secta
	8	345	11048	82600	.....	.....	.....	21964	1263.00	Secti
	9	392	12541	93700	.....	.....	.....	23486	1362.00	Secto
	10	438	14034	104800	.....	.....	.....	25007	1461.00	Secul
	12	531	17020	127200	.....	.....	.....	28377	1688.00	Secun
	14	625	20006	149500	.....	.....	.....	31912	1930.00	Secur
	16	719	22992	171800	.....	.....	.....	35621	2186.00	Sedat
	18	811	25978	194200	.....	.....	.....	39637	2470.00	Sedil
	20	903	28964	216800	.....	.....	.....	43992	2784.00	Sedim
45	4	166	5312	39700	.....	.....	.....	17117	954.00	Segme
	5	215	6874	51400	.....	.....	.....	18404	1032.00	Segre
	6	264	8437	63100	.....	.....	.....	19817	1121.00	Seign
	7	313	9999	74800	.....	.....	.....	21212	1208.00	Seism
	8	362	11561	86400	.....	.....	.....	22775	1311.00	Seiza
	9	411	13123	98200	.....	.....	.....	24344	1414.00	Selec
	10	460	14686	109800	.....	.....	.....	25909	1516.00	Selen
	12	556	17810	133200	.....	.....	.....	29383	1751.00	Selfi
	14	654	20935	156500	.....	.....	.....	33199	2017.00	Selva
	16	752	24059	179800	.....	.....	.....	37010	2283.00	Semap
	18	849	27184	202300	.....	.....	.....	41344	2594.00	Sembl
	20	948	30309	226500	.....	.....	.....	45773	2904.00	Semic

List Prices "National Quality" Tanks

Outside Diam. Feet	Outside Height Feet	Approx. Solution Cap. Tons	Capacity Cubic Feet	Approx. Capacity Gallons	Two-inch Lumber			Three-inch Lumber		
					Approx. Weight	List Price	Code Name	Approx. Weight	List Price	Code Name
46	4	173	5553	41500	.....	.....	.....	17777	$990.00	Semps
	5	224	7186	53700	.....	.....	.....	19092	1070.00	Senar
	6	275	8819	65900	.....	.....	.....	20533	1160.00	Senda
	7	326	10452	78200	.....	.....	.....	21959	1250.00	Senil
	8	378	12085	90400	.....	.....	.....	23555	1354.00	Senio
	9	432	13718	102600	.....	.....	.....	25156	1459.00	Sensa
	10	479	15351	114700	.....	.....	.....	26928	1579.00	Sensi
	12	582	18618	139100	.....	.....	.....	30473	1819.00	Sensu
	14	684	21884	162500	.....	.....	.....	34291	2082.00	Sente
	16	786	25150	188000	.....	.....	.....	38432	2375.00	Sentr
	18	888	28416	212400	.....	.....	.....	42673	2676.00	Separ
	20	990	31683	236800	.....	.....	.....	47263	3008.00	Sepsi
47	4	181	5799	43600	.....	.....	.....	18446	1027.00	Septe
	5	234	7504	56200	.....	.....	.....	19788	1108.00	Seque
	6	288	9210	68800	.....	.....	.....	21261	1201.00	Serag
	7	341	10915	81700	.....	.....	.....	22891	1307.00	Seral
	8	394	12621	94400	.....	.....	.....	24345	1398.00	Seren
	9	448	14327	107000	.....	.....	.....	26376	1533.00	Serge
	10	501	16032	119500	.....	.....	.....	27786	1627.00	Seria
	12	607	19443	145100	.....	.....	.....	31402	1872.00	Sermo
	14	714	22854	170800	.....	.....	.....	35373	2145.00	Serva
	16	820	26265	196100	.....	.....	.....	39697	2454.00	Sesam
	18	926	29676	221800	.....	.....	.....	44026	2760.00	Sesqu
	20	1030	33087	247200	.....	.....	.....	48867	3113.00	Seste
48	4	189	6050	45200	.....	.....	.....	19195	1070.00	Sever
	5	244	7830	73500	.....	.....	.....	20501	1157.00	Sewag
	6	300	9609	71800	.....	.....	.....	22002	1242.00	Sexag
	7	356	11389	85200	.....	.....	.....	23665	1350.00	Sexta
	8	412	13168	98500	.....	.....	.....	25329	1459.00	Sibil
	9	467	14948	111600	.....	.....	.....	26993	1568.00	Sideb
	10	522	16727	124900	.....	.....	.....	28836	1692.00	Sidin
	12	634	20287	151500	.....	.....	.....	32524	1941.00	Signa
	14	745	23846	178200	.....	.....	.....	36572	2221.00	Signi
	16	856	27405	204800	.....	.....	.....	40979	2533.00	Silen
	18	967	30964	231200	.....	.....	.....	45573	2861.00	Silic
	20	1078	34523	256000	.....	.....	.....	50336	3205.00	Silki
49	4	197	6307	47100	.....	.....	.....	19891	1109.00	Silve
	5	255	8162	61000	.....	.....	.....	21222	1187.00	Simou
	6	312	10017	74800	.....	.....	.....	22936	1299.00	Simul
	7	369	11873	88700	.....	.....	.....	24449	1394.00	Sinap
	8	427	13728	102600	.....	.....	.....	26147	1504.00	Sinfu
	9	484	15583	116500	.....	.....	.....	27842	1615.00	Singl
	10	531	17438	130400	.....	.....	.....	29722	1742.00	Sinua
	12	646	21148	158100	.....	.....	.....	33665	2011.00	Sipho
	14	759	24858	185800	.....	.....	.....	37790	2297.00	Siris
	16	872	28568	213500	.....	.....	.....	42281	2615.00	Siski
	18	1005	32278	241300	.....	.....	.....	46955	2948.00	Sisyp
	20	1125	35989	269000	.....	.....	.....	51995	3314.00	Situa

Advice on Mining and Reduction Plants

Whenever there may be call for them, this Company is pleased to offer expert consultants' services as an aid to any competent engineer or operator who faces special problems relating to design of tanks, foundations, structures or other equipment essential to success of the projected mining or reduction plant.

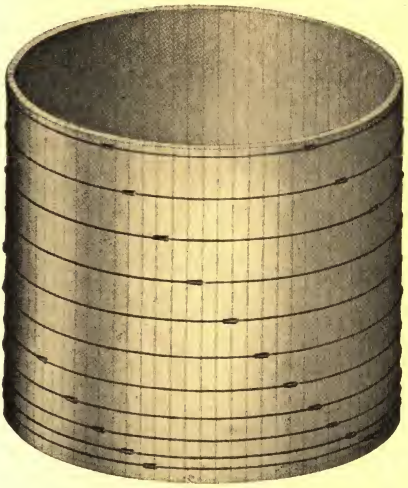
In the earlier development of the cyanide process our Company furnished designs for such plants which were then standard in the industry. In those days we also maintained a Metallurgical Department which made tests of ores on a laboratory scale as a means of determining the proper method of treating the ores.

These practices we have discontinued, since the scientific and technical development of the cyanide process advanced so rapidly as to make the old methods obsolete and supplant them with the more efficient modern practices. We continue our Engineering Department to guide in the manufacture of the best tank equipment it is possible to make and to advise regarding its use, but we no longer furnish plans, designs or advice on designs for installation of plants. This information can best be provided by a professional engineer who has made a special study of the ore and conditions involved, and who has scientifically tested carefully selected samples.

Mining and ore reduction processes are still being made more efficient by constant study and experimentation. Mistakes of the past in selection of the property to be developed and in installation of impractical or almost worthless plants have educated the mining fraternity to the fact that a competent engineer on the job is vitally essential. Such an engineer can furnish the definite specifications on which this Company will gladly make quotations. If he encounters peculiar obstacles or problems, he is welcome to call upon our Engineering Department for assistance.

After the proper system has been determined and plans of the plant have been drawn, it will be of advantage and profit to the owner to entrust this Company with the order. It is a matter of pride and carefully cherished reputation with us to manufacture and furnish the exact materials and equipment specified by your engineer.

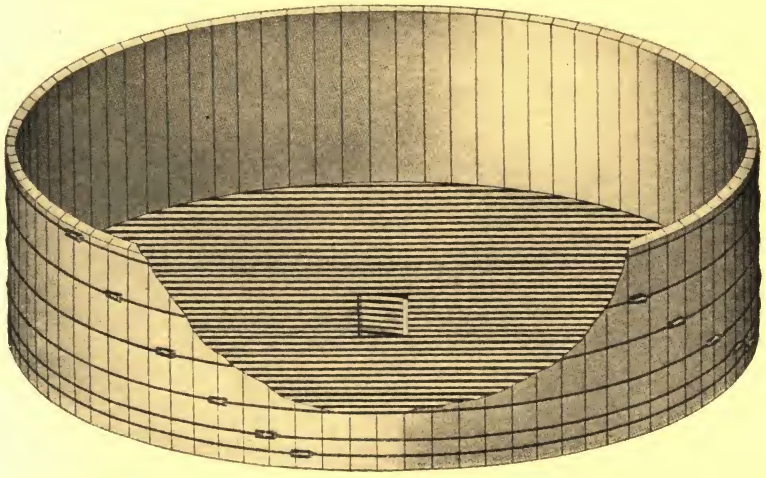
Solution Tanks



Code Name—Sitzb

A solution tank is usually located above the leaching tanks so that the solution may flow by gravity. The height and diameter are determined by local conditions, but where ordinary conditions prevail the length of the stave is approximately two-thirds the diameter. Standard practice requires that two or more solution tanks be used in the ordinary cyanide plant. Thirty-two cubic feet of solution is usually assumed to be equal to one ton of 2000 pounds, but this varies slightly in accordance with the specific gravity of the solution.

Leaching Tanks



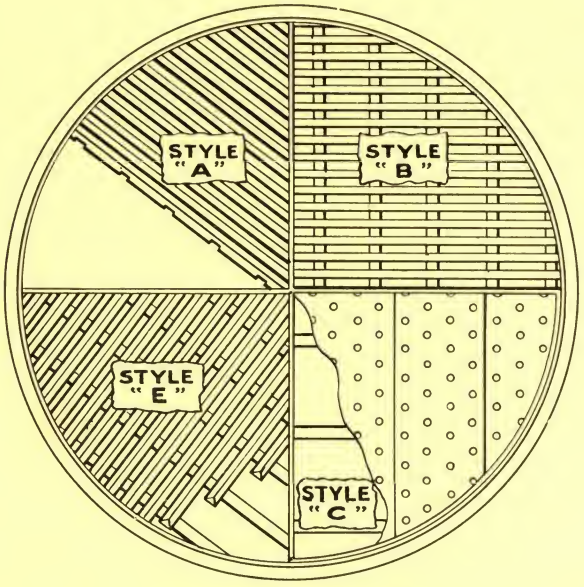
Code Name—Sixfo

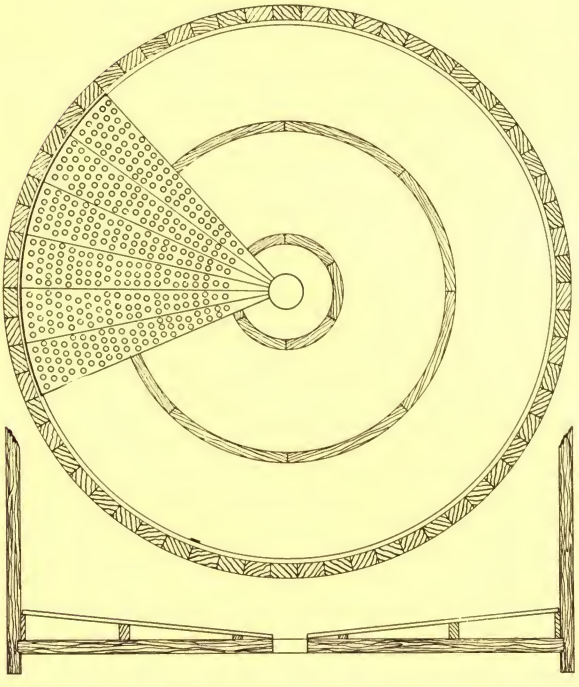
Leaching tanks are usually made with vertical sides to allow the saturated ore to settle uniformly. The general demand is for a shallow tank with 3′ to 10′ staves and proportionately larger diameter. The above illustration shows one type of false bottom that can be used. Other types are illustrated on page 78. Various styles of discharge doors used in connection with Leaching Tanks are described and illustrated on pages 85-88.

List prices do not include false bottom, discharge doors or filter cloths.

For Prices See Pages 65 to 75

False Bottoms





STYLE "D"

False Bottoms

False bottom equipment varies as greatly as do individual preferences of different men. Detailed descriptions of five of the types we find to be standard and most commonly preferred are given in the paragraphs that follow:

Style A

This bottom consists of a grating of crozed strips 1¼" by 1¾" Douglas Fir, laid on edge 1¼" apart. For protection of the filter cloth a thin wood band ⅜" thick is placed around the outer edge of these strips. This is a standard form of construction and gives the maximum filter surface. Code name—Sixoe.

Style B

Bottom strips of this false bottom consist of a grating of crozed strips 1¼" by 1¾" Douglas Fir, laid on edge and placed 2' centers. On the bottom strips is placed a grating made of ⅞"x⅞" Douglas Fir strips, spaced 1" apart. A thin wood band ⅜" thick is placed around the outer edge of the strips to prevent the filter cloth from being cut. Code name—Sixsc.

Style C

This filter bottom is constructed of a 1" Douglas Fir floor, provided with ½" holes, approximately 2" apart, and is supported by crozed strips as shown in the accompanying illustration. Code name—Sixte.

Style D

This filter bottom consists of 1" Douglas Fir boards, perforated with ½" holes spaced about 2" from center to center. The bottom rests upon segment circles 3' apart. The segment circles are of different heights and give the bottom a slope of 5 degrees toward the center. The under sides of the segment circles are crozed to allow a free circulation of the solution. On large diameter tanks, posts are used under the segment circles to permit full circulation of the solution. Special provisions are also made on tanks of large diameter to allow installation of more than one discharge door. Code name—Sixuf.

Style E

This bottom does not require the use of filter cloths. It consists of triangular strips, about 3" by 3" by 3", spaced ¼" apart and resting on crozed strips 1¼" by 1¾" Douglas Fir, laid on edge 2' centers. The spaces between the triangular strips are filled with gravel, sand and quartz, level with the upper edge. We particularly recommend this style of filter for copper leaching. Code name—Sixvb.

The descriptions given apply to the false bottoms proper and do not pertain to the cocoa matting, burlap or canvas filter cloths, which are described on page 83.

Special designs of false bottoms will be gladly worked out by our Engineering Department on request, or prices will be promptly quoted you upon receipt of your own special plans and specifications.

Directions for Erecting False Bottoms Style "B"

After the tank bottom is in position, lay the 1¼"x1¾" crozed strips 2 ft. centers on the bottom and place these strips at right angles to the bottom boards; then on top of the 1¼"x1¾" strips lay the ⅞"x⅞" strips at right angles to the 1¼"x1¾" crozed strips, place the ⅞"x⅞" strips one inch apart and nail to the crozed strips. After the ⅞" and the crozed strips are nailed together it is a good plan to cut the crozed strips so the false bottom will be in sections of a width that can be easily handled if you have occasion to lift the false bottom up at any future time.

In order that the false bottom will be the correct diameter after the tank is erected, take the center board in the bottom, which will have the center marking on it where the bottom was originally laid up, and use this as the center for your false bottom. Scribe a circle having a radius of 1¾" less than the radius of the center board for 3" tanks, and 1⅝" shorter than the radius of the center board for 2" tanks. Cut off the crozed strips and the ⅞"x⅞" strips to the circle scribed on the bottom and then nail the ⅜"x1¼" finishing strip around the entire circumference of the false bottom. This will make the false bottom the correct diameter after the tank is erected.

It will be found advantageous to construct other styles in a similar manner before the staves of the tank are set in position, and we recommend that before the staves are set up, the false bottom be built on top of the tank bottom proper.

False Bottoms

Style "A"

Diameter Tank Ft.	In.	Shipping Weight Lbs.	List Price	Code Name	Diameter Tank Ft.	In.	Shipping Weight Lbs.	List Price	Code Name
3	0	22	$1.00	Sizle	13	6	429	$15.50	Souch
3	6	29	1.50	Sobin	14	0	462	16.50	Soulf
4	0	38	1.50	Sobri	14	6	495	18.00	Suasi
4	6	48	2.00	Socia	15	0	530	19.00	Subac
5	0	59	2.50	Sockd	16	0	603	21.50	Subje
5	6	71	3.00	Sodaw	18	0	763	27.00	Subju
6	0	85	3.50	Softe	20	0	942	33.50	Subli
6	6	100	4.00	Soire	22	0	1140	40.00	Subme
7	0	115	4.50	Solan	24	0	1357	48.00	Subor
7	6	133	5.00	Soldi	25	0	1473	52.00	Subpo
8	0	151	5.50	Solfe	26	0	1593	56.00	Subsc
8	6	170	6.50	Solic	28	0	1847	64.50	Subur
9	0	191	7.00	Solit	30	0	2121	76.00	Subve
9	6	213	8.00	Solub	32	0	2413	84.50	Suckl
10	0	236	8.50	Somat	34	0	2724	95.00	Sucti
10	6	260	9.50	Someh	36	0	3054	106.50	Sudar
11	0	285	10.50	Somna	40	0	3770	131.50	Suita
11	6	312	11.50	Sonan	42	0	4156	144.50	Sulki
12	0	339	12.50	Sonif	44	0	4562	158.50	Sulph
12	6	368	13.50	Sonor	48	0	5429	188.50	Sulta
13	0	398	14.50	Sorti	50	0	5891	204.50	Sumpi

False Bottoms

Style "B"

Diameter Tank Ft.	In.	Shipping Weight Lbs.	List Price	Code Name	Diameter Tank Ft.	In.	Shipping Weight Lbs.	List Price	Code Name
3	0	18	$1.00	Sunda	13	6	358	$10.50	Talen
3	6	24	1.00	Suret	14	0	385	11.50	Talka
4	0	31	1.00	Surfb	14	6	413	12.00	Talmu
4	6	40	1.50	Surmi	15	0	442	13.00	Tamab
5	0	49	1.50	Surpr	16	0	503	14.50	Tamal
5	6	59	2.00	Suspe	18	0	636	18.00	Tamba
6	0	71	2.50	Susta	20	0	785	22.50	Tamta
6	6	83	2.50	Tabar	22	0	950	27.00	Tande
7	0	96	3.00	Tabef	24	0	1131	32.00	Tangr
7	6	110	3.50	Tabin	25	0	1227	34.50	Tapet
8	0	126	4.00	Tabul	26	0	1327	37.50	Tapio
8	6	142	4.50	Tacam	28	0	1539	43.00	Tapro
9	0	159	5.00	Tacho	30	0	1767	49.50	Tarax
9	6	177	5.50	Tachy	32	0	2011	56.50	Tarla
10	0	196	6.00	Tackl	34	0	2270	63.50	Tarpa
10	6	216	6.50	Tacti	36	0	2544	71.00	Tasta
11	0	238	7.00	Tagli	40	0	3142	87.50	Taugh
11	6	260	7.50	Tailb	42	0	3464	96.50	Tauri
12	0	283	8.50	Takin	44	0	3801	117.50	Taute
12	6	307	9.00	Talar	48	0	4524	125.50	Taver
13	0	332	9.50	Talbo	50	0	4909	136.00	Tawdr

Style "C"

Diameter Tank Ft.	In.	Shipping Weight Lbs.	List Price	Code Name	Diameter Tank Ft.	In.	Shipping Weight Lbs.	List Price	Code Name
3	0	27	$2.00	Taxab	13	6	492	$ 29.00	Terat
3	6	33	2.50	Taxid	14	0	528	31.00	Tereb
4	0	48	3.00	Taxon	14	6	567	33.00	Teret
4	6	60	4.00	Tearf	15	0	609	35.50	Tergi
5	0	75	4.50	Techn	16	0	690	40.50	Terma
5	6	90	5.50	Tecto	18	0	876	51.00	Terme
6	0	108	6.50	Tediu	20	0	1080	63.00	Termi
6	6	126	7.50	Teino	22	0	1308	76.00	Terna
7	0	147	9.00	Teled	24	0	1554	90.00	Terra
7	6	168	10.00	Tenab	25	0	1686	98.00	Terre
8	0	192	11.50	Tende	26	0	1824	105.50	Terri
8	6	201	12.00	Tensi	28	0	2118	122.50	Tersa
9	0	219	13.00	Tenta	30	0	2430	140.50	Terse
9	6	243	14.50	Tente	32	0	2766	160.00	Terti
10	0	270	16.00	Tenui	34	0	3120	180.50	Tesse
10	6	297	17.50	Tenuo	36	0	3498	202.00	Testa
11	0	327	19.50	Tenur	40	0	4320	249.50	Teste
11	6	357	21.00	Tepef	42	0	4764	275.00	Testi
12	0	390	23.00	Tepif	44	0	5226	301.50	Testo
12	6	423	25.00	Tenor	48	0	6222	358.50	Testu
13	0	456	27.00	Terap	50	0	6750	389.00	Testy

False Bottoms

Style "D"

Diameter Tank Feet	Shipping Weight Lbs.	List Price	Code Name	Diameter Tank Feet	Shipping Weight Lbs.	List Price	Code Name
10	198	$18.00	Tetea	24	1381	$116.50	Theme
11	246	22.00	Tethe	25	1480	124.50	Thenc
12	284	25.00	Tetra	26	1602	135.50	Theoc
13	366	31.50	Tette	27	1734	146.00	Theod
14	432	37.50	Teuto	28	1798	151.50	Theog
15	493	42.50	Tewel	29	2045	170.50	Theol
16	549	47.50	Texti	30	2178	182.50	Theor
17	628	53.50	Texto	31	2320	194.50	Theos
18	758	66.00	Textu	32	2438	206.00	Thera
19	848	72.00	Thane	33	2705	226.50	Theri
20	933	79.00	Thatc	34	2843	238.50	Therm
21	1035	88.00	Thaum	35	2979	251.50	Thesi
22	1117	95.00	Theat	36	3184	267.50	Thesp
23	1281	108.00	Theis				

Style "E"

(Sand Filter)

Diameter Tank Feet	Shipping Weight Lbs.	List Price	Code Name	Diameter Tank Feet	Shipping Weight Lbs.	List Price	Code Name
6	93	$ 3.50	Theur	24	1810	$60.50	Thoug
7	154	5.50	Theye	25	1963	65.50	Thous
8	201	7.00	Theig	26	2124	70.50	Thral
9	254	8.50	Thiev	27	2291	76.00	Thras
10	314	10.50	Thill	28	2463	82.00	Threa
11	380	13.00	Thimb	29	2642	88.00	Thren
12	452	15.00	Thine	30	2827	94.00	Thres
13	531	18.00	Thinl	31	3019	100.50	Thric
14	616	20.50	Thins	32	3217	107.00	Thrid
15	707	23.50	Thirs	33	3421	113.50	Thrif
16	804	27.00	Thirt	34	3632	120.50	Thriv
17	908	30.50	Thist	35	3848	128.00	Throa
18	1018	34.00	Thith	36	4072	135.00	Throb
19	1134	38.00	Thole	37	4301	143.00	Throe
20	1257	42.00	Thong	38	4536	150.50	Thron
21	1385	46.00	Thora	39	4776	158.50	Thrum
22	1521	50.50	Thorn	40	5027	167.00	Thrus
23	1662	55.50	Thoro				

Filter Cloths

Customary practice in Leaching Plants is to use a filter cloth of 8 or 10 oz. canvas resting upon burlap, hop cloth or cocoa matting which, in turn, rests upon the false bottom.

Burlap and duck filters are cut 4 inches larger than the outside diameter of tank.

Hop cloth and cocoa matting are cut to fit inside diameter of tank.

Burlap and duck filters are cut to circle, sewed and hemmed.

Hop cloth and cocoa matting are cut to circle and bound.

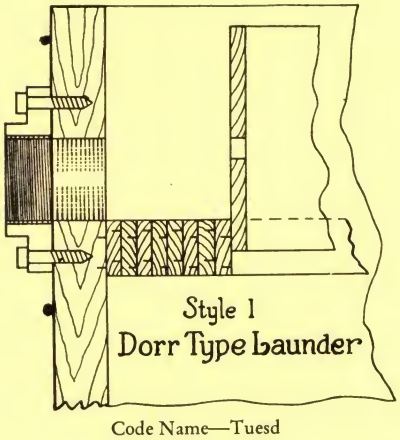
The action of some solutions decays the filter cloths quickly, but if protected by strips of wood and a thin coating of sand to prevent abrasive action, they will serve the purpose even after the life has been so destroyed that they cannot be moved without disintegration, and will still be an efficient filter medium.

Filter Cloths for Leaching Tanks

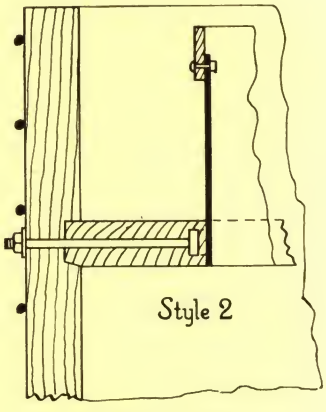
Dia. of Tank	Burlap		8-oz. Canvas		10-oz. Canvas		Hop Cloth		Cocoa Matting	
	List Price	Code Name	List Price	Code Name	List Price	Code Name	List Price	Code Name	List Price	Code Name
10	$ 4.10	Thumb	$ 7.65	Timel	$ 8.95	Tomah	$ 5.60	Toyis	$17.50	Triad
11	4.40	Thump	8.65	Timet	10.20	Tombs	5.60	Toysh	21.10	Trian
12	4.75	Thund	10.00	Timoc	11.90	Tomor	6.90	Trach	25.10	Triar
13	5.20	Thuri	11.20	Timor	13.35	Tomti	7.75	Tradi	28.25	Triba
14	5.70	Thurs	12.95	Tinct	15.50	Tonel	8.70	Tradu	32.45	Trieh
15	6.00	Thwac	13.90	Tinde	16.70	Tongu	10.10	Trafi	36.90	Trico
16	6.60	Thwar	15.30	Tinfo	18.40	Tonna	11.30	Traga	41.60	Tride
17	7.70	Thyme	17.45	Tinge	20.95	Tonsu	12.00	Tragi	46.25	Trifl
18	8.10	Thymy	19.60	Tingl	23.60	Topar	12.60	Trail	52.40	Trifo
19	8.65	Thtro	21.60	Tinke	26.00	Topaz	14.35	Trait	58.30	Triga
20	9.70	Thyse	22.70	Tinkl	27.40	Tophe	15.90	Traje	62.75	Trigr
21	10.45	Tiara	26.00	Tinse	31.45	Topma	16.60	Trala	69.00	Trihe
22	11.00	Tibia	28.45	Tippe	34.50	Topog	17.95	Tramo	74.90	Trila
23	12.00	Ticke	29.90	Tipto	36.20	Torch	19.50	Tramr	81.25	Trime
24	12.90	Tickl	32.25	Tirad	39.20	Toreu	21.00	Trane	88.50	Trine
25	13.50	Tidal	34.80	Tires	42.30	Torme	23.10	Tranq	96.90	Trink
26	15.20	Tidbi	38.15	Tissu	46.30	Torna	24.60	Trans	104.20	Triph
27	16.00	Tidel	41.10	Titan	49.95	Torpe	26.35	Trapa	110.75	Tripo
28	16.60	Tides	43.90	Titha	53.50	Torre	28.10	Trash	120.40	Trise
29	17.70	Tidil	46.00	Tithi	56.05	Torse	29.20	Traum	127.90	Tritu
30	18.95	Tidin	48.75	Titil	59.40	Torti	30.95	Trave	138.50	Trium
31	19.90	Tierc	51.75	Titmo	63.15	Torto	32.75	Treac	147.00	Trive
32	20.95	Tiffa	55.25	Titul	67.45	Torus	34.70	Treas	158.70	Troch
33	21.90	Tiger	58.65	Toadf	71.70	Totle	36.40	Trefo	168.50	Tropi
34	23.40	Tilbu	62.20	Toady	75.90	Toupe	38.30	Tremb	178.90	Troub
35	24.80	Tilin	64.90	Tobac	79.20	Touse	41.20	Tremo	187.25	Troyw
36	25.70	Tilla	68.65	Tocsi	83.80	Towar	43.40	Trenc	202.25	Trucu
37	27.40	Timba	72.10	Togot	88.10	Towli	45.90	Trepa	215.00	Trudg
38	28.90	Timbr	76.30	Toilf	93.30	Townc	47.60	Treph	229.00	Trunc
39	30.10	Timek	80.60	Token	98.60	Towra	50.40	Trepi	243.75	Tryng
40	31.10	Timep	84.75	Toler	103.80	Toxic	53.30	Tresp	258.75	Tubul

For price on intermediate sizes use next larger size.

Launders



Code Name—Tuesd



Code Name—Tufal

The illustrations on this page show two types of circular Launders. Both are of standard construction of the inside type. When required we also make Launders to be fitted on the outside of the tank, as described below.

INSIDE LAUNDER
STYLE No. 1

The "Dorr Type Launder" is constructed of ¾" x 2½" finish size strips, securely nailed to each other as well as to the inside of the tank, with a piece of ¾" finished thickness lumber nailed on the inner edge to form the side. The number of ¾" by 2½" strips varies according to the width of Launder desired, while the width of the ¾" inner piece varies according to the depth desired.

This style launder is standard equipment for Dorr Thickener Tanks.

INSIDE LAUNDER
STYLE No. 2

A croze is worked in each stave near the top, the distance varying according to the depth of launder required.

The bottom is made of several segments joined together by splines and held in place by numerous bolts.

Sheet steel is used for the side which is screwed to the bottom. A leveling strip is attached by carriage bolts through the top of the iron so the top of the launder may be adjusted to remain in the same horizontal plane.

OUTSIDE LAUNDER
Code Name—Tufte

The standard Outside Launder is made just the reverse of Style No. 2 Inside Launder, with the segment pieces crozed into the outside of the stave and held in place by bolts. A calking seam is placed on the outside edge of the segments so that water-tight joints are assured.

A leveling strip can be used with Outside Launder by installing our Patent Tanks, which have a groove in the top of the staves so such strip may be inserted in it and adjusted to fit any unequal settlement of the staves.

NOTE—Launders of any style or dimensions will be made by this Company to fit individual requirements.

Plug Discharge Doors

We make two styles of Plug Discharge Doors, as shown in the accompanying illustrations.

Fig. 1

Fig. 2

Fig. 1. This Plug is used where an inexpensive installation is desired. It consists of a cast-iron flanged ring, which is bolted to the tank bottom and receives the wood plug that is fitted with an iron handle. A tight joint between the Plug and cast-iron ring is made by means of 3/8" square hemp packing.

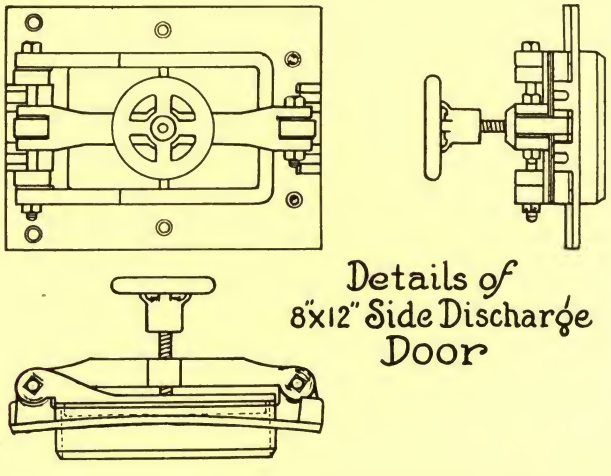
Fig. 2. This type of Plug is controlled from the top of the tank by means of a hand wheel. When opened the valve drops down and allows the contents to discharge freely.

Figure 1				Figure 2			
Size of Opening	Shipping Weight	List Price	Code Name	Size of Opening	Shipping Weight	List Price	Code Name
8" 10"	60 lbs. 80 lbs.	$9.50 11.50	Tuiti Tumbl	10"	150 lbs.	$50.00	Tumul

Specify inside height of tank

Side Discharge Doors

Give outside diameter of tank and thickness of staves when ordering Side Discharge Doors. We can then furnish them so they will properly fit the periphery of the tank.



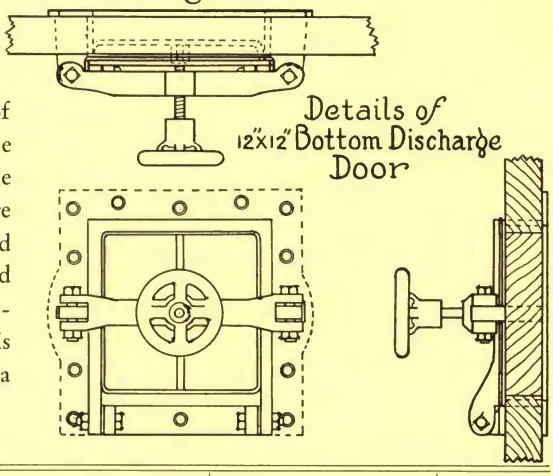
Details of 8"x12" Side Discharge Door

Size of Opening Inches	Shipping Weight	List Price	Code Name
8 x 8	66 lbs.	$15.00	Tunab
8 x 12	81 lbs.	17.50	Tunef
8 x 16	135 lbs.	26.00	Turba

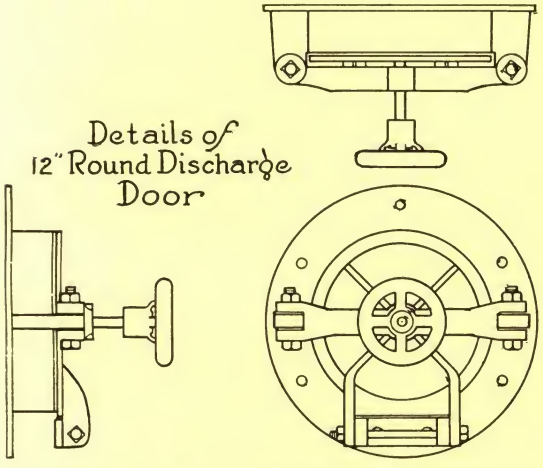
Bottom Discharge Doors

Square Pattern

The frames and covers of our Discharge Doors are made from heavy cast-iron. The cross bar and hinge plate are so designed and constructed as to stand the strain placed upon them. The opening between the door and frame is made tight by means of a rubber gasket.



Size of Opening Inches	Shipping Weight	List Price	Code Name
10 x 10	90 lbs.	$19.50	Turci
12 x 12	100 lbs.	20.50	Turge
16 x 16	160 lbs.	29.50	Turmo



Round Pattern

Some customers prefer the Round Door to the Square, so we are prepared to furnish either. However, the details of construction are the same on both types.

Size of Opening Inches	Shipping Weight	List Price	Code Name
8	60 lbs.	$14.50	Turnc
12	90 lbs.	19.50	Turns
16	130 lbs.	26.50	Turpe

The above prices cover doors complete with necessary bolts and gaskets. When ordering be sure to specify the thickness of the tank bottom, so that the proper length of bolts may be furnished.

All list prices in this catalog are subject to discount.

Directions for Attaching Bottom Discharge Doors

Cut a hole in the bottom of the tank a trifle larger than that portion of the door frame that goes through the bottom of the tank. Put the door frame in place and lay-off the bolt holes. Remove the frame and bore the holes exactly the same size as the bolts furnished. Cut and fit a burlap gasket around the rim of the door frame, then paint that portion of the door frame and the bottom against which the gasket rests, saturate the gasket with acid-proof paint, replace the door and bolt same in position. All bolts passing through the tank bottom should be a driving fit. Instead of forcing the bolts through with a hammer, which may cause slivering of the tank bottom, a wrench should be used to screw the bolts in place. To close the door, fasten the cross bar in place by using the bolt and apply the pressure by means of hand wheel. A little consideration will show at once how the door will swing.

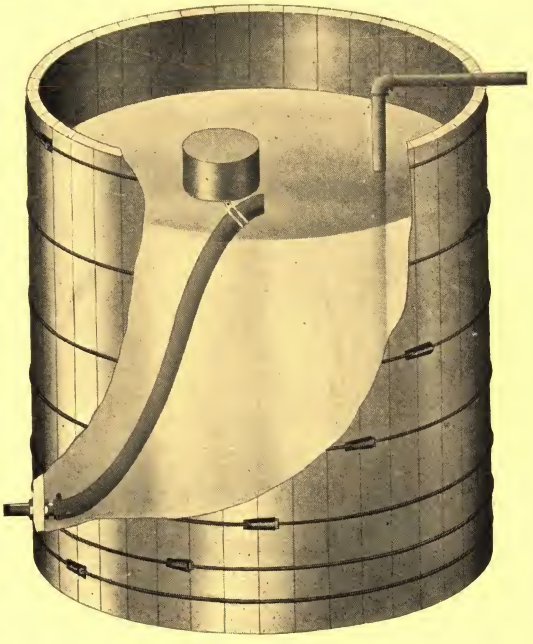
Directions for Attaching Side Discharge Doors

After determining the location of the discharge door, cut a hole through the side of the tank a trifle larger than the portion of the door frame that goes through the staves. The bottom of the opening in the staves should be approximately 2″ above the tank bottom. Place the door in position and bore the holes to receive the bolts. After this is done, remove the door, cut and fit a burlap gasket around the rim of the door frame. Then paint that portion of the door frame and the staves against which the gasket rests, and saturate the gasket with acid-proof paint. Now replace the door and bolt same in position.

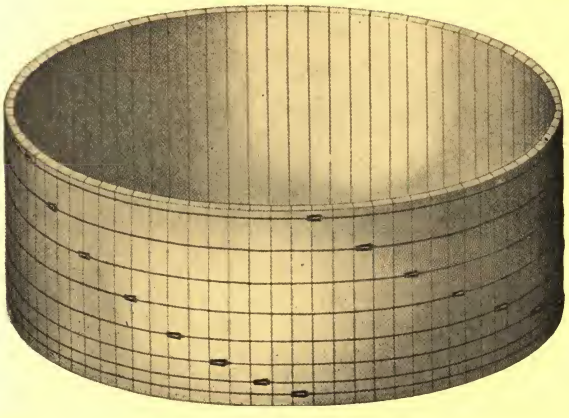
Gold Storage Tanks

An ordinary tank may be converted into a Gold storage tank by using a decanting hose and float in order to take the outflow from the top of the contents. These tanks are used just ahead of the precipitators and are for the accumulation of solutions from the Leaching Tanks. They serve to maintain a steady flow of the solution that passes through the zinc boxes or other precipitants and also to act as a settler tank and remove any solids which the solutions may contain.

Prices on Application



Code Name—Turtl



Code Name—Tusco

Sump Tanks

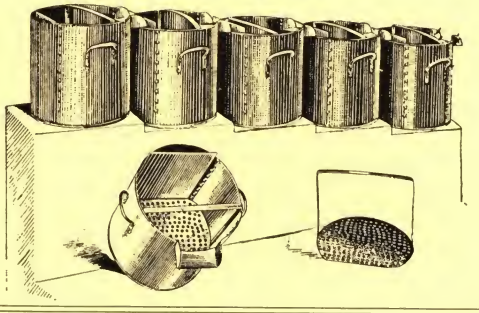
Sump Tanks are used to receive the barren solution after it passes the precipitators and may be of any desired dimensions. It is customary, where head room is a factor, to use a short stave with a larger diameter. In many instances, however, longer staves and smaller diameters are preferred and installed, even if necessary to excavate a pit to receive the tanks. Such excavation is usually more economical than construction of the additional mill building that might be required to cover the tanks. Two or more Sump Tanks are required.

For Prices See Pages 65 to 75

A mill in California using the Cyanide process and "National Quality" Douglas Fir Tanks.

Improved Zinc Boxes

Round Pattern



Size of Box	Capacity of Box	Shipping Weight	List Price	Code Name
15″ x 15″	1 cu. ft.	25 lbs.	$11.00	Umbra
18″ x 24″	3 cu. ft.	40 lbs.	13.50	Umpir

The use of this type of box enables the user to handle each cell separately, which has an advantage in making a clean-up. It also gives an opportunity to increase the capacity by adding additional boxes.

The round cell makes it easier to distribute the shavings uniformly over the tray.

Description of Zinc Boxes

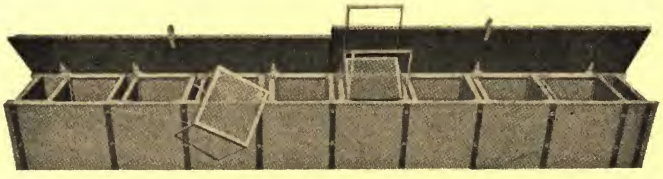
Below we list a few standard sizes of Wooden Zinc Boxes, but we also construct precipitation boxes in accordance with specifications submitted by our customers.

In the construction of our standard sizes, we aim at deep compartments to compel the solution to pass through a thick bed of zinc shavings. The boxes are made very durable and are held together by iron rods which pass vertically and horizontally through the wood. By using this construction it can easily be seen that the solution cannot reach the iron rods which hold the box together. The bottom has a slope of 1″ toward the discharge.

All compartments are furnished with improved screen shaving trays.

The above does not apply to single compartment sheet-iron boxes shown on page 90.

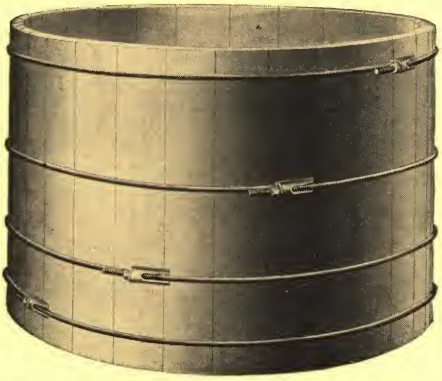
Zinc Boxes



The wooden zinc box as shown in the accompanying illustration is probably the most satisfactory for cyanide work. Our standard boxes have from 6 to 12 compartments and are furnished complete with screen trays and cover. We can manufacture any size precipitation box desired, equipped either with or without a clean-up launder.

Capacity of Plant Tons	Length of Box Feet	Width of Box Inches	Height of Box Inches	Number of Compartments	Shipping Weight Lbs.	Price without Launder	Code Name
5 to 10	8	12	18	6	400	$120.00	Unabl
15 to 20	12	18	24	7	640	150.00	Unaco
25 to 50	16	18	24	9	800	170.00	Unado
60 to 100	16	24	24	8	885	180.00	Unoft
200	16	24	30	7	1130	200.00	Unalt
500	18	24	36	8	1300	240.00	Unans

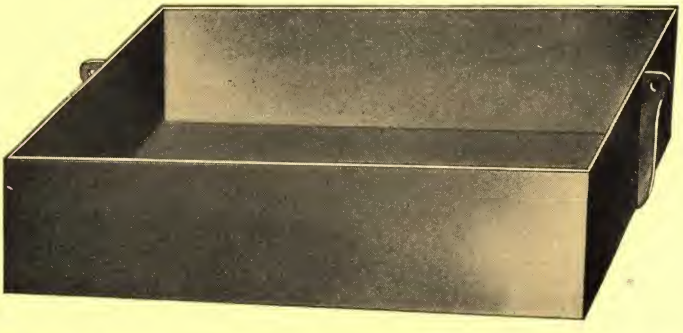
Acid Tanks



Capacity Gallons	Diameter Ft.	Diameter In.	Height Ft.	Height In.	Thickness	Weight	List Price	Code Name
60	2	6	2	6	2	136	$14.50	Unaut
80	2	6	3	0	2	154	15.50	Unawa
100	3	0	3	0	2	185	16.50	Unbar
150	3	6	3	0	2	226	19.00	Unbec
200	4	0	3	0	2	266	22.00	Unbla
250	4	0	4	0	2	333	26.50	Unbol
300	4	3	4	0	2	357	28.00	Unbou
350	4	6	4	0	2	383	29.50	Unbri
400	4	9	4	0	2	403	31.00	Unbuc

Cast Iron Drying Pans

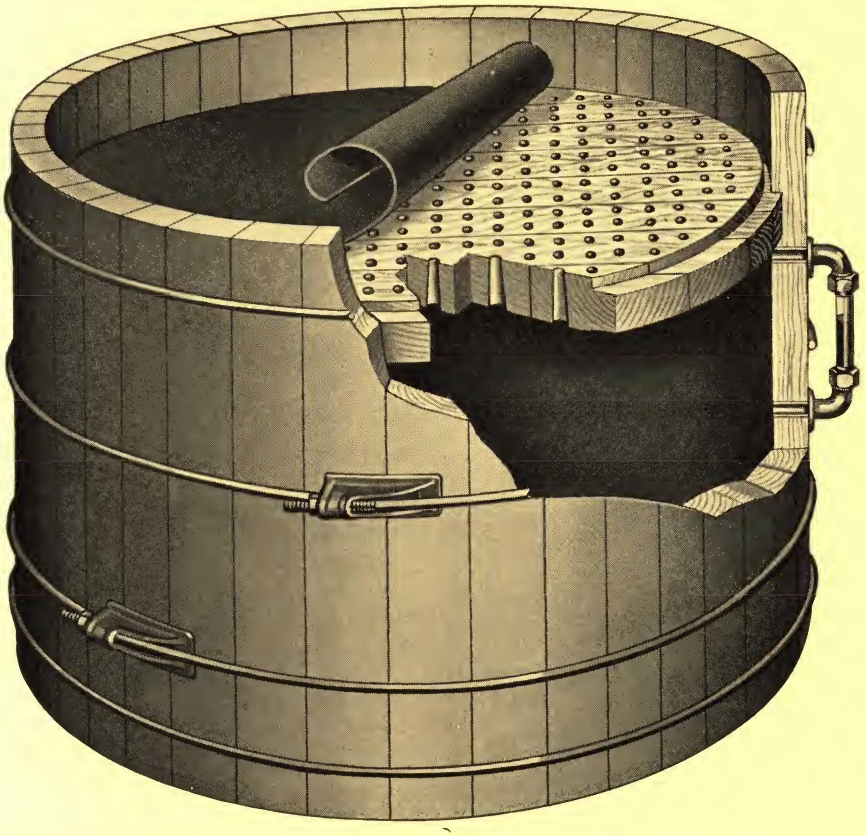
For Cyanide Slimes



These pans are manufactured from iron, cast with thick bottom and sides, so that they will not warp out of shape when used in treating zinc box precipitates.

Size	Weight	List Price	Code Name
24″x18″x6″	95 lbs.	$13.00	Uncag
24″x24″x6″	130 lbs.	22.00	Uncer

Vacuum Clean-Up Tanks



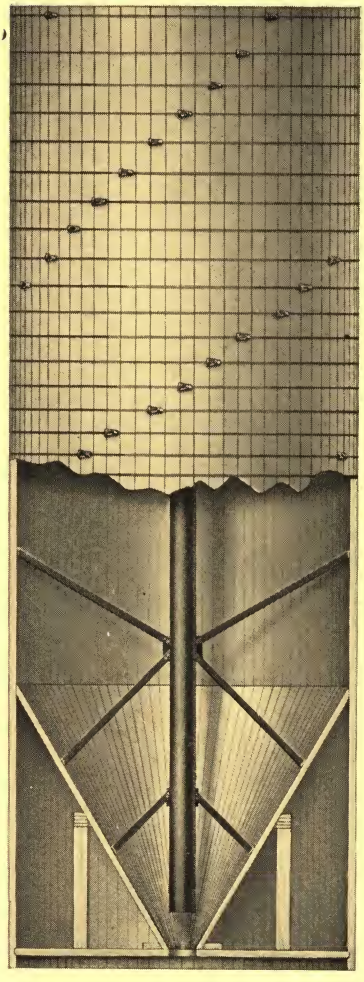
Code Name—Uncha

This "National Quality" Vacuum Clean-Up Tank is specially designed for filtering precipitates from zinc boxes and is a necessary and valuable part of your clean-up room equipment. The tank is 36″ outside diameter x 35″ high outside and has a heavy perforated head crozed into the staves. Tank is equipped with one 8-oz. duck filter cloth and one solution gauge.

Shipping weight 300 lbs. List Price, $50.00

Prices of other sizes on application.

Pachuca Agitating Tank



The illustration shows what is commonly called a Pachuca Tank, in which agitation is effected by air pressure. These tanks are circular in shape, are equipped with about a 60° conical false bottom and a central air pipe.

This air pipe is located in the middle of the tank. It extends from approximately 18 inches above discharge to about 18 inches from the top of the tank, and is supported by braces to the sides of the tank. The diameter is about one-tenth that of the tank.

A valve is required at the apex of the cone for discharging contents after agitation.

At the center of the apex of the cone and directly at center of the air pipe a sleeve valve or ball cock is placed for the entrance of the air.

After the tank is filled with solution and ore, the air valve is opened. This permits the air to enter the tube under pressure, forcing an upward current and overflowing at the top while fresh pulp is taken in at the bottom. A complete circulation of the pulp is produced by this action, and is continued until all the values have passed into solution.

The length of the agitation is determined by the character of the ore treated.

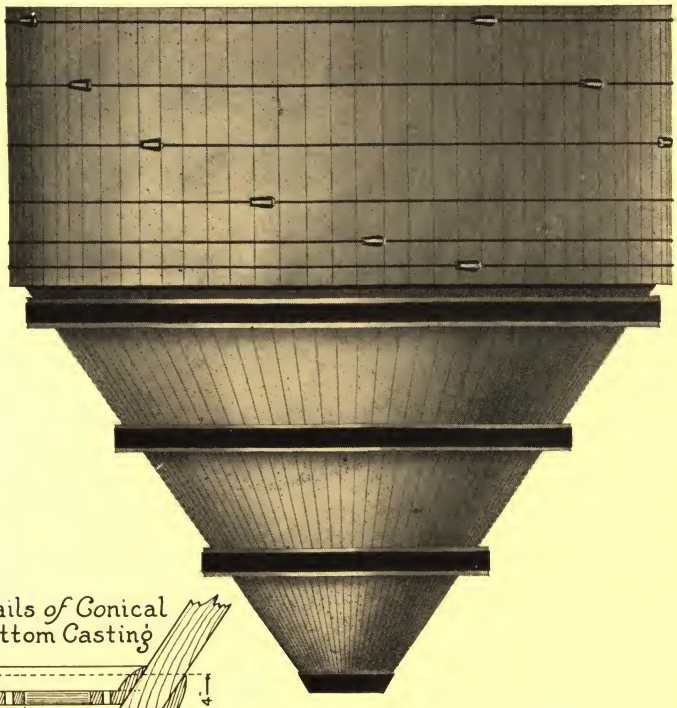
Standard Sizes

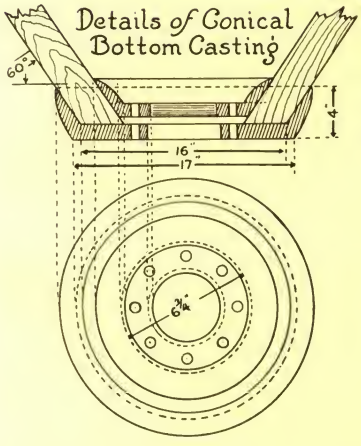
Prices on Application

Dia. x Height Feet	Capacity in Cubic Feet	Nominal Capacity Tons per 24 Hours	Air Consumption, cu. ft. Free Air per Minute	Pressure Pounds	Weight Pounds	Code Name
10 x 30	1800	15–20	50	20–30	13,000	Uneir
12 x 36	3000	35–40	75	20–30	20,000	Uncla
15 x 45	5500	50–60	100	30–40	30,000	Uncom

Special sizes can be furnished if desired.

Conical Bottom Tanks





Code Name—Uncre

Illustration shows tank 12′ diameter by 5′ vertical staves and 8′ depth of cone, with conical bottom sloping 55°, including bottom cone casting and segmental foundation supports.

Discharge opening can be made any size.

Conical bottom tanks are used satisfactorily for settling, agitating, classifying and for pulp thickeners, and in many respects are superior to the flat bottom tanks provided with a false conical bottom. The diameter and height can be whatever is required. Most tanks have a sloping bottom of 45°. The casting at the apex of the cone is usually made of cast iron, but can also be made of bronze or other suitable metal.

Prices on Application

Rectangular Tanks

Code Name—Uncul

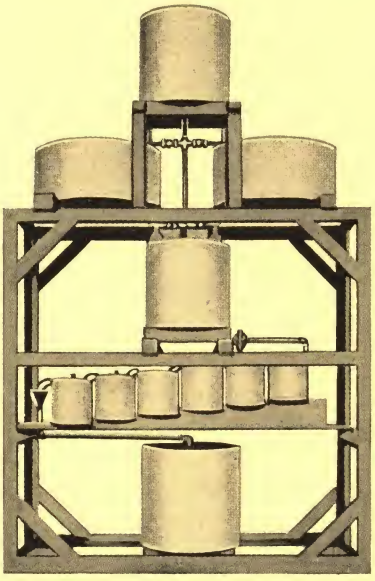
The manufacture of a rectangular tank requires extremely careful construction as, due to the shape of the tank, the hydraulic pressure is exerted in such a manner that it is sometimes difficult to devise a satisfactory design. Our experience in the design and construction of rectangular tanks is at the service of our customers and we are ready at any time to have our Engineering Department specify the type of construction that would be the most satisfactory to use. In asking for information specify what the tanks are to be used for and we will cheerfully furnish complete specifications for the tanks required. Also, remember that we can furnish bronze rods or lead covered steel rods when conditions demand them.

Jigs—Flotation Cells

Code Name—Uncvm

On account of the variety of designs for both jigs and flotation tanks, we do not attempt to list any standard design. We are in a position to manufacture any shape or size required and will be pleased to submit quotations upon receipt of specifications or information.

Assayer's Cyanide Plant



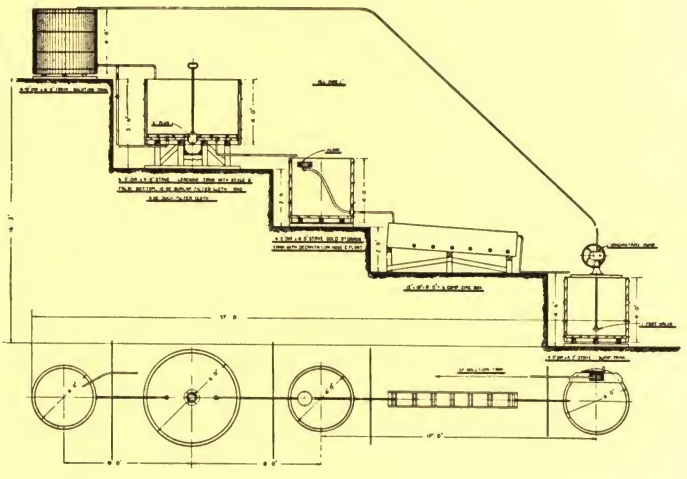
Code Name—Ungov

The above cut illustrates design of a small Cyanide Plant for assaying purposes, having a capacity of from one hundred to two hundred pounds of ore.

The small tank shown at the highest elevation is to be used as a Solution Tank, while the two tanks just below it are intended for Leaching Tanks, and are fitted complete with False Bottoms and Duck Filter Cloths. The Gold Storage Tank is directly under the Leaching Tanks, and below this the Zinc Precipitation Boxes; these boxes are arranged in units so that any number from one to six can be used in making a test.

The piping is so arranged that the solution can be fed to either the top or bottom of Leaching Tanks.

Shipping Weight, 150 lbs. List Price, $100.00



Code Name—Ungra

Three-Ton Experimental Cyanide Plant

Intended to assist the purchaser in determining definitely what style plant is needed for his particular ore. An assayer can determine from the limited quantity of ore under test if a very shallow or deeper leaching tank gives the best results, and often an assayer's test offers no difficulty whatever, when on a larger scale the ore packs and proves impervious to the solution. To do away with this uncertainty we offer a cheap and efficient method for making preliminary tests. The leaching tank included in this plant is 3½′ deep and fitted complete with false bottom and duck filter cloth.

A hand pump is connected with the sump tank by suction pipe in order to pump the solution back to the solution tank.

List price, $350.00

Shipping weight 2500 lbs.

"National" Cyanide Paint

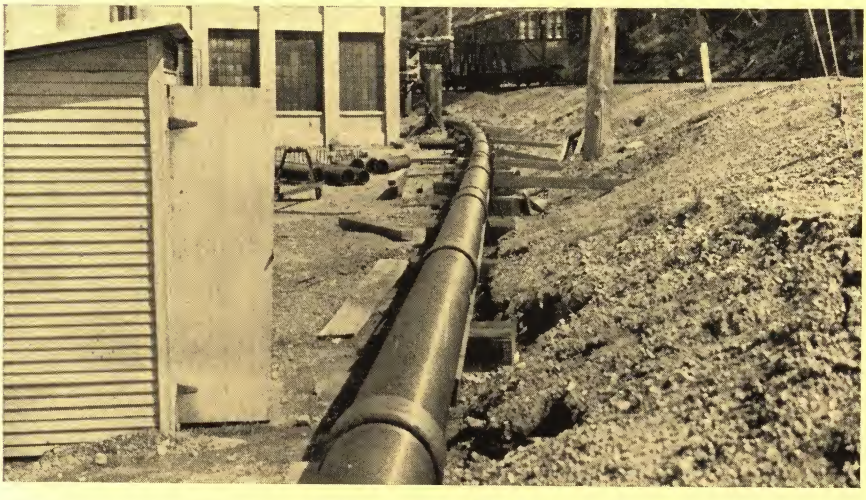
Acid Resisting

This paint is especially prepared to meet the requirements of cyanide operators at mills using the process. It is much cheaper than the mineral paint heretofore used at cyanide mills. It is a preservative of wood and iron.

	List Price	Code Name
5 bbl. Lot, per gallon	$1.00	Ungua
1 bbl. Lot, per gallon	$1.10	Unhal
Less than 1 bbl., per gallon	$1.20	Unhap

Wood Pipe

"National Quality" Wood Water Pipe



"National Quality" Wood Acid Pipe

"National Quality" Wire Wound Wood Stave Pipe is made in sizes from 2″ to 24″ inside diameter. Wood Pipe Catalog and prices will be sent to you upon request.

Wood Pipe

48″ Wood Pipe for power development

36″ Wood Pipe for industrial water

"National Quality" continuous stave wood pipe is made in all sizes from 6 inches to 20 feet inside diameter. It is extensively used for municipal water systems, power development, irrigation, and industrial purposes.

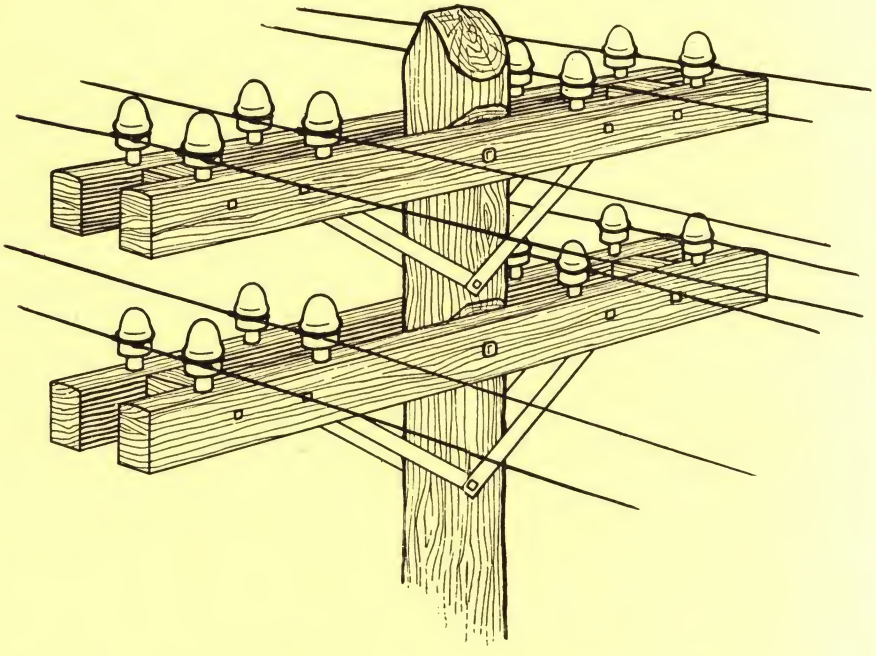
We will be glad to send you our Wood Pipe Catalog and prices upon request.

Wood Flumes

12′0″ "National Quality" Wood Flume

Interior of 12′0″ Wood Flume

We manufacture flumes in all sizes. Our Engineering Department will be pleased to help you work out plans and specifications covering your requirements. Prices on application.



Standard Crossarm

We are prepared to furnish Douglas Fir Crossarms, for Power Lines, Telephone and Telegraph Lines, manufactured in accordance with any specifications.

Our Crossarms are a "National Quality" product throughout. They are made with the same care and skill as "National Quality" tanks. Our superior quality has won for us a large volume of business from the principal users throughout the United States.

When specifications require, Douglas Fir Crossarms can be furnished creosote pressure treated, creosote dipped, carbolineum dipped or painted with best quality mineral paint or lead and oil.

We do not recommend open tank process for creosote unless it is only to take the place of painting.

Prices on application

Reference Tables and Information

On this and the following pages we are publishing, for your convenience, reference tables and useful information gathered from sources which we consider quite reliable.

Please keep in mind that our Engineering Department is always ready and willing to work with you in the preparation of plans and specifications covering your tank or pipe requirements.

Useful Information

25 cubic feet of sand = 1 ton.
18 cubic feet of earth = 1 ton.
17 cubic feet of clay = 1 ton.
13 cubic feet of quartz, unbroken in lode = 1 ton.

18 cubic feet of gravel or earth, before digging = 27 cubic feet when dug.

20 cubic feet of quartz broken (of ordinary fineness coming from the lode) = 1 ton contract measurement.

A horsepower is equivalent to raising 33,000 lbs. 1 foot per minute or 550 lbs. 1 foot per second.

For sluicing tailings out of leaching tanks it requires approximately 100 gallons of water per ton of tailings.

The consumption of cyanide is approximately from ½ lb. to 1 lb. per ton of ore treated.

The consumption of zinc in precipitation boxes is from ¼ lb. to ½ lb. per ton of ore treated.

To find circumference of a circle multiply diameter by 3.1416.

To find diameter of a circle, multiply circumference by .31831.

To find area of a circle, multiply square of diameter by .7854.

To find capacity of tanks in cubic feet: Square diameter of bottom in feet; multiply the square of the mean diameter by the depth (all in feet), and this product by 5⅞; the result will be in gallons, absolutely correct.

To find weight of water in tank, multiply capacity in gallons by 8.34.

A cubic foot of water contains 7½ gallons and weighs 62½ lbs.

A miner's inch of water is equal to nine gallons per minute.

A cubic foot per second is equal to 50 miner's inches, or 450 gallons per minute.

A gallon of fresh water weighs 8.34 lbs., and contains 231 cubic inches.

A cubic foot of fresh water weighs 62.5 lbs. and contains 1728 cubic inches, or 7.5 gallons.

Doubling the diameter of a tank multiplies the area of the bottom four times.

Theoretically water can be raised by suction 33 feet, but practically only 25 to 28 feet.

27,154 gallons of water will cover one acre one inch deep.

225 gallons per minute, or 25 miner's inches, will be sufficient to cover one acre one inch deep in two hours and one minute.

Following is a table of equivalents of the weights and measures used in this country and those used generally in South American trade:

1 hectare	=2.47104	acres.
1 acre	=0.4047	hectares.
1 kilometer	=0.62137	miles.
1 mile	=1.6093	kilometers.
1 meter	=3.2808	feet.
1 foot	=0.3048	meters.
1 liter	=0.908	quarts, dry.
1 liter	=1.0567	quarts, liquid.
1 gallon	=3.7853	liters.
1 kilogram	=2.2046	lbs. (Avoir.)
1 pound av.	=0.45359	kilogram.

Circumference and Areas of Circles

Diameter	Circumference	Area	Diameter	Circumference	Area
1	3.1416	.7854	51	160.222	2042.83
2	6.2832	3.1416	52	163.363	2123.72
3	9.4248	7.0686	53	166.505	2206.19
4	12.5664	12.5664	54	169.646	2290.23
5	15.708	19.635	55	172.788	2375.83
6	18.8496	28.2744	56	175.93	2463.01
7	21.9912	38.4846	57	179.071	2551.76
8	25.1328	50.2656	58	182.213	2642.09
9	28.2744	63.6174	59	185.354	2733.98
10	31.416	78.54	60	188.496	2827.44
11	34.5576	95.0334	61	191.638	2922.47
12	37.6992	113.098	62	194.779	3019.08
13	40.8408	132.733	63	197.921	3117.25
14	43.9824	153.938	64	201.062	3217.00
15	47.124	176.715	65	204.204	3318.31
16	50.2656	201.062	66	207.346	3421.2
17	53.4072	226.981	67	210.487	3525.66
18	56.5488	254.47	68	213.629	3631.69
19	59.6904	283.529	69	216.77	3739.29
20	62.832	314.16	70	219.912	3848.46
21	65.9736	346.361	71	223.054	3959.2
22	69.1152	380.134	72	226.195	4071.51
23	72.2568	415.477	73	229.337	4185.4
24	75.3984	452.39	74	232.478	4300.85
25	78.54	490.875	75	235.62	4417.87
26	81.6816	530.93	76	238.762	4536.47
27	84.8232	572.557	77	241.903	4656.64
28	87.9648	615.754	78	245.045	4778.37
29	91.1064	660.521	79	248.186	4901.68
30	94.248	706.86	80	251.328	5026.56
31	97.3896	754.769	81	254.47	5153.01
32	100.5312	804.25	82	257.611	5281.03
33	103.673	855.301	83	260.753	5410.62
34	106.814	907.922	84	263.894	5541.78
35	109.956	962.115	85	267.036	5674.51
36	113.098	1017.878	86	270.178	5808.82
37	116.239	1075.213	87	273.319	5944.69
38	119.381	1134.118	88	276.461	6082.14
39	122.522	1194.593	89	279.602	6221.15
40	125.664	1256.64	90	282.744	6361.74
41	128.806	1320.26	91	285.886	6503.9
42	131.947	1385.45	92	289.027	6647.63
43	135.089	1452.2	93	292.169	6792.92
44	138.23	1520.53	94	295.31	6939.79
45	141.372	1590.43	95	298.452	7088.23
46	144.514	1661.91	96	301.594	7238.25
47	147.655	1734.95	97	304.735	7389.83
48	150.797	1809.56	98	307.877	7542.98
49	153.938	1885.75	99	311.018	7697.71
50	157.08	1963.5	100	314.16	7854.00

Table of Decimal Equivalents of Parts of 1 Inch

1/64	.015625	17/64	.265625	33/64	.515625	49/64	.765625
1/32	.03125	9/32	.28125	17/32	.53125	25/32	.78125
3/64	.046875	19/64	.296875	35/64	.546875	51/64	.796875
1/16	.0625	5/16	.3125	9/16	.5625	13/16	.8125
5/64	.078125	21/64	.328125	37/64	.578125	53/64	.828125
3/32	.09375	11/32	.34375	19/32	.59375	27/32	.84375
7/64	.109375	23/64	.359375	39/64	.609375	55/64	.859375
1/8	.125	3/8	.375	5/8	.625	7/8	.875
9/64	.140625	25/64	.390625	41/64	.640625	57/64	.890625
5/32	.15625	13/32	.40625	21/32	.65625	29/32	.90625
11/64	.171875	27/64	.421875	43/64	.671875	59/64	.921875
3/16	.1875	7/16	.4375	11/16	.6875	15/16	.9375
13/64	.203125	29/64	.453125	45/64	.703125	61/64	.953125
7/32	.21875	15/32	.46875	23/32	.71875	31/32	.96875
15/64	.234375	31/64	.484375	47/64	.734375	63/64	.984375
1/4	.25	1/2	.50	3/4	.75	1	1.00

U. S. Gallons in Round Tanks

For One Foot in Depth

Dia. of Tanks	No. U. S. Gals.	Cubic Ft. and Area in Sq. Ft.	Dia. of Tanks	No. U. S. Gals.	Cubic Ft. and Area in Sq. Ft.	Dia. of Tanks	No. U. S. Gals.	Cubic Ft. and Area in Sq. Ft.
1 ft.	5.87	.785	5 ft. 8 in.	188.66	25.22	19 ft.	2120.90	283.53
1 1 in.	6.89	.922	5 9	194.25	25.97	19 3 in.	2177.10	291.04
1 2	8.00	1.069	5 10	199.92	26.73	19 6	2234.00	298.65
1 3	9.18	1.227	5 11	205.67	27.49	19 9	2291.70	306.35
1 4	10.44	1.396	6	211.51	28.27	20	2350.10	314.16
1 5	11.79	1.576	6 3	229.50	30.68	20 3	2409.20	322.06
1 6	13.22	1.767	6 6	248.23	33.18	20 6	2469.10	330.06
1 7	14.73	1.969	6 9	267.69	35.78	20 9	2529.60	338.16
1 8	16.32	2.182	7	287.88	38.48	21	2591.00	346.36
1 9	17.99	2.405	7 3	308.81	41.28	21 3	2653.00	354.66
1 10	19.75	2.640	7 6	330.48	44.18	21 6	2715.80	363.05
1 11	21.58	2.885	7 9	352.88	47.17	21 9	2779.30	371.54
2	23.50	3.142	8	376.01	50.27	22	2843.60	380.13
2 1	25.50	3.409	8 3	399.88	53.46	22 3	2908.60	388.82
2 2	27.58	3.687	8 6	424.48	56.75	22 6	2974.30	397.61
2 3	29.74	3.976	8 9	449.82	60.13	22 9	3040.80	406.49
2 4	31.99	4.276	9	475.89	63.62	23	3108.00	415.48
2 5	34.31	4.587	9 3	502.70	67.20	23 3	3175.90	424.56
2 6	36.72	4.909	9 6	530.24	70.88	23 6	3244.60	433.74
2 7	39.21	5.241	9 9	558.51	74.66	23 9	3314.00	443.01
2 8	41.78	5.585	10	587.52	78.54	24	3384.10	452.39
2 9	44.43	5.940	10 3	617.26	82.52	24 3	3455.00	461.86
2 10	47.16	6.305	10 6	640.74	86.59	24 6	3526.60	471.44
2 11	49.98	6.681	10 9	678.95	90.76	24 9	3598.90	481.11
3	52.88	7.069	11	710.90	95.03	25	3672.00	490.87
3 1	55.86	7.467	11 3	743.58	99.40	25 3	3745.80	500.74
3 2	58.92	7.876	11 6	776.99	103.87	25 6	3820.30	510.71
3 3	62.06	8.296	11 9	811.14	108.43	25 9	3895.60	527.77
3 4	65.28	8.727	12	846.03	113.10	26	3971.60	530.93
3 5	68.58	9.168	12 3	881.65	117.86	26 3	4048.40	541.19
3 6	71.97	9.621	12 6	918.00	122.72	26 6	4125.90	551.55
3 7	75.44	10.085	12 9	955.09	127.68	26 9	4204.10	562.00
3 8	78.99	10.559	13	992.91	132.73	27	4283.00	572.66
3 9	82.62	11.045	13 3	1031.50	137.89	27 3	4362.70	583.21
3 10	86.33	11.541	13 6	1070.80	143.14	27 6	4443.10	593.96
3 11	90.13	12.048	13 9	1110.80	148.49	27 9	4524.30	604.81
4	94.00	12.566	14	1151.50	153.94	28	4606.20	615.75
4 1	97.96	13.095	14 3	1193.00	159.48	28 3	4688.80	626.80
4 2	102.00	13.635	14 6	1235.30	165.13	28 6	4772.10	637.94
4 3	106.12	14.186	14 9	1278.20	170.87	28 9	4856.20	649.18
4 4	110.32	14.748	15	1321.90	176.71	29	4941.00	660.52
4 5	114.61	15.321	15 3	1366.40	182.65	29 3	5026.60	671.96
4 6	118.97	15.90	15 6	1411.50	188.69	29 6	5112.90	683.49
4 7	123.42	16.50	15 9	1457.40	194.83	29 9	5199.90	695.13
4 8	127.95	17.10	16	1504.10	201.06	30	5287.70	706.86
4 9	132.56	17.72	16 3	1551.40	207.39	30 3	5376.20	718.69
4 10	137.25	18.35	16 6	1599.50	213.82	30 6	5465.40	730.62
4 11	142.02	18.99	16 9	1648.40	220.35	30 9	5555.40	742.64
5	146.88	19.63	17	1697.90	226.98	31	5646.10	754.77
5 1	151.82	20.29	17 3	1748.20	233.71	31 3	5737.50	766.99
5 2	156.83	20.97	17 6	1799.30	240.53	31 6	5829.70	779.31
5 3	161.93	21.65	17 9	1851.10	247.45	31 9	5922.60	791.73
5 4	167.12	22.34	18	1903.60	254.47	32	6016.20	804.25
5 5	172.38	23.04	18 3	1956.80	261.59	32 3	6110.60	816.86
5 6	177.72	23.76	18 6	2010.80	268.80	32 6	6205.70	829.58
5 7	183.15	24.48	18 9	2065.50	276.12	32 9	6301.50	842.39

Diameters as given above are inside measurements.

31½ Gallons equal 1 Barrel

To find the capacity of tanks greater than the largest given in the table, look in the table for a tank of one-half of the given size, and multiply its capacity by 4, or of one-third its size and multiply its capacity by 9, etc.

Troy Weights

24 grains = 1 pwt.
480 grains = 20 pwt. = 1 oz.
5760 grains = 240 pwt. = 12 oz. = 1 lb. = 22.816 cu. in. of distilled water at 62° Fahr.

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1 Troy ounce contains	31.10348 grams
1 avoirdupois ounce contains	28.3475 grams
1 avoirdupois pound contains	453.5924277 grams
1 ton water	= Appr. 240.3 gallons
Recent practice also	= 32⅛ cu. ft.

Assay Ton Weights

1 pound avoirdupois	= 7000 Troy grains
2000 pounds	= 1 ton
2000 x 7000	= 14,000,000 Troy grains
480 Troy grains	= 1 oz. Troy
14,000,000 ÷ 480	= 29,166 Troy ounces
29,166 milligrams	= 1 assay ton

2000 pounds: 1 assay ton:: 1 oz. Troy: 1 milligram

Atomic Weights

Metals	Symbol	Atomic Weight
Aluminum	Al.	27.4
Antimony	Sb.	119.5
Arsenic	As.	75.0
Barium	Ba.	137.0
Bismuth	Bi.	206.5
Boron	B.	11.0
Bromine	Br.	80.0
Cadmium	Cd.	112.0
Caesium	Cs.	131.9
Calcium	Ca.	40.0
Carbon	C.	12.0
Cerium	Ce.	138.3
Chlorine	Cl.	35.5
Chromium	Cr.	52.2
Cobalt	Co.	58.6
Copper	Cu.	63.4
Fluorine	F.	19.0
Gold	Au.	195.7
Hydrogen	H.	1.0
Iodine	I.	125.9
Iridium	Ir.	191.7
Iron	Fe.	56.0
Lead	Pb.	205.4
Lithium	Li.	7.0
Magnesium	Mg.	24.0
Manganese	Mn.	55.0
Mercury	Hg.	200.0
Molybdenum	Mo.	96.0
Nickel	Ni.	58.0
Nitrogen	N.	14.0
Oxygen	O.	16.0
Palladium	Pd.	106.0
Phosphorus	P.	31.0
Platinum	Pt.	193.4
Potassium	K.	39.1
Rhodium	Rh.	102.2
Selenium	Se.	79.0
Silicon	Si.	28.0
Silver	Ag.	108.0
Sodium	Na.	23.0
Strontium	Sr.	87.0
Sulphur	S.	32.0
Tellurium	Te.	126.5
Tin	Sn.	118.0
Tungsten	W.	184.0
Uranium	U.	237.8
Vanadium	V.	51.3
Zinc	Zn.	65.0
Zirconium	Zr.	89.6

Above weights are approximate but close.

Table of Heating Degrees

	C	F
Red	525°	955°
Dark Red	700°	1292°
Cherry Red	850°	1562°
Light Red	900°	1652°
Yellow	1100°	2012°
White	1300°	2372°
Full White	1500°	2732°

Weights of Square and Round Steel Bars

Per Lineal Foot — One Cubic foot of steel weighing 489.6 lbs.

Size in Inches	Square Weight in Lbs.	Round Weight in Lbs.	Size in Inches	Square Weight in Lbs.	Round Weight in Lbs.
1/16	.013	.010	4 1/8	57.85	45.44
1/8	.053	.042	4 1/4	61.41	48.24
3/16	.119	.094	4 3/8	65.08	51.11
1/4	.212	.167	4 1/2	68.85	54.07
5/16	.333	.261	4 5/8	72.73	57.12
3/8	.478	.375	4 3/4	76.71	60.25
7/16	.651	.511	4 7/8	80.81	63.46
1/2	.850	.667	5	85.00	66.76
9/16	1.076	.845	5 1/8	89.30	70.14
5/8	1.328	1.043	5 1/4	93.72	73.60
11/16	1.608	1.262	5 3/8	98.23	77.15
3/4	1.913	1.502	5 1/2	102.80	80.77
13/16	2.245	1.763	5 5/8	107.6	84.49
7/8	2.603	2.044	5 3/4	112.4	88.29
15/16	2.989	2.347	5 7/8	117.4	92.17
1	3.400	2.670	6	122.4	96.14
1 1/8	4.303	3.379	6 1/8	127.6	100.2
1 1/4	5.312	4.173	6 1/4	132.8	104.3
1 3/8	6.428	5.049	6 3/8	138.2	108.5
1 1/2	7.650	6.008	6 1/2	143.6	112.8
1 5/8	8.978	7.051	6 5/8	149.2	117.2
1 3/4	10.41	8.178	6 3/4	154.9	121.7
1 7/8	11.95	9.388	6 7/8	160.8	126.2
2	13.60	10.68	7	166.6	130.9
2 1/8	15.35	12.06	7 1/8	172.6	135.6
2 1/4	17.22	13.52	7 1/4	178.7	140.4
2 3/8	19.18	15.07	7 3/8	184.9	145.3
2 1/2	21.25	16.69	7 1/2	191.3	150.2
2 5/8	23.43	18.40	7 5/8	197.7	155.2
2 3/4	25.71	20.20	7 3/4	204.2	160.3
2 7/8	28.10	22.07	7 7/8	210.8	165.6
3	30.60	24.03	8	217.6	171.0
3 1/8	33.20	26.08	8 1/8	224.5	176.3
3 1/4	35.92	28.20	8 1/4	231.4	181.8
3 3/8	38.73	30 42	8 3/8	238.5	187.3
3 1/2	41.65	32.71	8 1/2	245.6	193.0
3 5/8	44.68	35.09	8 5/8	252.9	198.7
3 3/4	47.82	37.56	8 3/4	260.3	204.4
3 7/8	51.05	40.10	8 7/8	267.9	210.3
4	54.40	42.73	9	275.4	216.3

Weights of Flat Rolled Steel

Per Lineal Foot — One cubic foot of steel weighing 489.6 Lbs.

Width in inches	Thickness in Inches													
	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16	1
1	.64	.85	1.06	1.28	1.49	1.70	1.92	2.12	2.34	2.55	2.76	2.98	3.19	3.40
1 1/4	.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.19	3.45	3.72	3.99	4.25
1 1/2	.957	1.28	1.59	1.92	2.23	2.55	2.87	3.19	3.51	3.83	4.14	4.47	4.78	5.10
1 3/4	1.11	1.49	1.86	2.23	2.60	2.98	3.35	3.72	4.09	4.47	4.84	5.20	5.58	5.95
2	1.28	1.70	2.12	2.55	2.98	3.40	3.83	4.25	4.67	5.10	5.53	5.95	6.38	6.80
2 1/4	1.44	1.91	2.39	2.87	3.35	3.83	4.30	4.78	5.26	5.75	6.21	6.62	7.18	7.65
2 1/2	1.59	2.12	2.65	3.19	3.72	4.25	4.78	5.31	5.84	6.38	6.90	7.44	7.97	8.50
2 3/4	1.75	2.34	2.92	3.51	4.09	4.67	5.26	5.84	6.43	7.02	7.60	8.18	8.77	9.35
3	1.91	2.55	3.19	3.83	4.46	5.10	5.74	6.38	7.02	7.65	8.29	8.93	9.57	10.20
3 1/4	2.07	2.76	3.45	4.15	4.83	5.53	6.22	6.91	7.60	8.29	8.98	9.67	10.36	11.05
3 1/2	2.23	2.98	3.72	4.47	5.20	5.95	6.70	7.44	8.18	8.93	9.67	10.41	11.16	11.90
3 3/4	2.39	3.19	3.99	4.78	5.58	6.38	7.17	7.97	8.76	9.57	10.36	11.16	11.95	12.75
4	2.55	3.40	4.25	5.10	5.95	6.80	7.65	8.50	9.35	10 20	11.05	11.90	12.75	13.60
4 1/4	2.71	3.61	4.52	5.42	6.32	7.22	8.13	9.03	9.93	10.84	11.74	12 65	13.55	14.45
4 1/2	2.87	3.83	4.78	5.74	6.70	7.65	8.61	9.57	10.52	11.48	12.43	13.39	14.34	15.30
4 3/4	3.03	4.04	5.05	6.06	7.07	8.08	9.09	10.10	11.11	12.12	13.12	14.13	15.14	16.15
5	3.19	4.25	5.31	6.38	7.44	8.50	9.57	10.63	11.69	12.75	13.81	14.87	15.94	17.00
5 1/4	3.35	4.46	5.58	6.69	7.81	8.93	10.04	11.16	12.27	13.39	14.50	15.62	16.74	17.85
5 1/2	3.51	4.67	5.84	7.02	8.18	9.35	10.52	11.69	12.85	14.03	15.19	16.36	17.53	18.70
5 3/4	3.67	4.89	6.11	7.34	8.56	9.77	11.00	12.22	13.44	14.67	15.88	17.10	18.33	19.55
6	3.83	5.10	6.38	7.65	8.93	10.20	11.48	12.75	14.03	15 30	16.58	17.85	19.13	20.40
7	4.46	5.95	7.44	8.93	10.41	11.90	13.39	14.87	16.36	17.85	19.34	20.83	22.32	23.80
8	5.10	6.80	8.50	10.20	11.90	13.60	15.30	17.00	18.70	20.40	22.10	23.80	25.50	27.20

Conversion Factors

MULTIPLY	BY	TO OBTAIN
acres	43560.	square feet
"	4047.	square meters
"	.001562	square miles
"	4840.	square yards
acre-feet	43560.	cubic-feet
" "	325900.	gallons
ares	.02471	acres
"	100.	square meters
atmospheres	76.	cms. of mercury
"	29.92	inches of mercury
"	33.90	feet of water
"	10333.	kgs. per square meter
"	14.70	pounds per sq. inch
"	1.058	tons per sq. foot
British thermal units	.2520	kilogram-calories
" " "	777.6	foot-pounds
" " "	.0003927	horse-power-hours
" " "	1055.	joules
" " "	107.5	kilogram-meters
" " "	.0002928	kilowatt-hours
B. t. u. per min	12.96	foot-pounds per sec.
" " "	.02356	horse-power
" " "	.01757	kilowatts
" " "	17.57	watts
bushels	1.244	cubic feet
"	2150.	cubic inches
"	.03524	cubic meters
"	4.	pecks
"	64.	pints (dry)
"	32.	quarts (dry)
centigrams	.01	grams
centiliters	.01	liters
centimeters	.3937	inches
"	.01	meters
"	393.7	mils
"	10.	millimeters
centimeters of mercury	.01316	atmospheres
" " "	.4461	feet of water
" " "	136.	kgs. per square meter
" " "	27.85	pounds per square foot
" " "	.1934	pounds per square inch
centimeters per second	1.969	feet per minute
" " "	.03281	feet per second
" " "	.036	kilometers per hour
" " "	.6	meters per minute
" " "	.02237	miles per hour
" " "	.0003728	miles per minute
circular mils	.000005067	square centimeters
" "	.0000007854	square inches
" "	.7854	square mils
cubic centimeters	.00003531	cubic feet
" "	.06102	cubic inches
" "	.000001	cubic meters
" "	.000001308	cubic yards
" "	.0002642	gallons
" "	.001	liters

Conversion Factors

MULTIPLY	BY	TO OBTAIN
cubic centimeters (cont'd)	.002113	pints (liq.)
" "	.001057	quarts (liq.)
cubic feet	28320.	cubic cms.
" "	1728.	cubic inches
" "	.02832	cubic meters
" "	.03704	cubic yards
" "	7.481	gallons
" "	28.32	liters
" "	59.84	pints (liq.)
" "	29.92	quarts (liq.)
cubic feet per minute	472.	cubic cms. per sec.
" " " "	.1247	gallons per sec.
" " " "	.472	liters per second
" " " "	62.4	pounds of water per min.
cubic inches	16.39	cubic centimeters
" "	.0005787	cubic feet
" "	.00001639	cubic meters
" "	.00002143	cubic yards
" "	.004329	gallons
" "	.01639	liters
" "	106100	mil-feet
" "	.03463	pints (liq.)
" "	.01732	quarts (liq.)
cubic meters	1000000.	cubic centimeters
" "	35.31	cubic feet
" "	61023.	cubic inches
" "	1.308	cubic yards
" "	264.2	gallons
" "	1000.	liters
" "	2113.	pints (liq.)
" "	1057.	quarts (liq.)
cubic yards	27.	cubic feet
" "	46656.	cubic inches
" "	.7646	cubic meters
" "	202.	gallons
" "	764.6	liters
" "	1616.	pints (liq.)
" "	807.9	quarts (liq.)
cubic yards per minute	.45	cubic feet per second
" " " "	3.367	gallons per second
" " " "	12.74	liters per second
days	24.	hours
"	1440.	minutes
"	86400.	seconds
drams	1.772	grams
"	.0625	ounces
dynes	.001020	grams
"	.00007233	poundals
"	.000002248	pounds
ergs	.00000000009486	British thermal units
"	1.	dyne-centimeters
"	.00000007376	foot-pounds
"	.001020	gram-centimeters
"	.0000001	joules
"	.00000001020	kilogram-meters
ergs per second	.000000005692	B. t. units per minute

Conversion Factors

MULTIPLY	BY	TO OBTAIN
ergs per second (cont'd)	.000004426	foot-pounds per minute
" " "	.00000007376	foot-pounds per second
" " "	.0000000001341	horse-power
" " "	.000000001434	kg. calories per min.
" " "	.0000000001	kilowatts
fathoms	6.	feet
feet	30.48	centimeters
"	12.	inches
"	.3048	meters
"	1/3	yards
feet of water	.02950	atmospheres
" " "	.8826	inches of mercury
" " "	304.8	kgs. per square meter
" " "	62.43	pounds per square foot
" " "	.4335	pounds per square inch
feet per minute	.5080	centimeters per second
" " "	.01667	feet per second
" " "	.01829	kilometers per hour
" " "	.3048	meters per minute
" " "	.01136	miles per hour
feet per second	30.48	centimeters per second
" " "	1.097	kilometers per hour
" " "	.5921	knots per hour
" " "	18.29	meters per minute
" " "	.6818	miles per hour
" " "	.01136	miles per minute
feet per 100 feet	1.	per cent grade
feet per second per second	30.48	cms. per sec. per sec.
" " " " "	1.097	kms. per hour per sec.
" " " " "	.3048	meters per sec. per sec.
" " " " "	.6818	miles per hour per sec.
foot-pounds	.001286	British thermal units
" "	13560000.	ergs
" "	.0000005050	horse-power-hours
" "	1.356	joules
" "	.0003239	kilogram-calories
" "	.1383	kilogram-meters
" "	.0000003766	kilowatt-hours
foot-pounds per minute	.001286	B. t. units per minute
" " " "	.01667	foot-pounds per second
" " " "	.00003030	horse-power
" " " "	.0003241	kg.-calories per min.
" " " "	.00002260	kilowatts
foot-pounds per second	.07717	B. t. units per minute
" " " "	.001818	horse-power
" " " "	.01945	kg.-calories per min.
" " " "	.001356	kilowatts
furlongs	40.	rods
gallons (water), U. S.	8.345	pounds
"	.833111	Imperial gallons
"	3785.	cubic centimeters
"	.1337	cubic feet
"	231.	cubic inches
"	.003785	cubic meters
"	.004951	cubic yards
"	3.785	liters

Conversion Factors

MULTIPLY	BY	TO OBTAIN
gallons (water) (cont'd)	8.	pints (liq.)
"	4.	quarts (liq.)
gallons per minute	.002228	cubic feet per second
" " "	.06308	liters per second
gills	.1183	liters
"	.25	pints (liq.)
grains (troy)	1.	grains (av.)
" "	.0648	grams
" "	.04167	pennyweights (troy)
grams	980.6	dynes
"	15.43	grains (troy)
"	.001	kilograms
"	1000.	milligrams
"	.03527	ounces
"	.03215	ounces (troy)
"	.07093	poundals
"	.002205	pounds
gram-calories	.003968	British thermal units
gram-centimeters	.00000009296	British thermal units
" "	980.6	ergs
" "	.00007233	foot-pounds
" "	.00009807	joules
" "	.00000002344	kilogram-calories
" "	.00001	kilogram-meters
hectares	2.471	acres
"	107600.	square feet
horse-power	42.41	B. t. units per min.
" "	33000.	foot-pounds per min.
" "	550.	foot-pounds per sec.
" "	1.014	horse-power (metric)
" "	10.69	kg.-calories per min.
" "	.7457	kilowatts
" "	745.7	watts
horse-power (boiler)	33520.	B. t. u. per hour
" " "	9.804	kilowatts
horse-power-hours	2545.	British thermal units
" " "	1980000.	foot-pounds
" " "	2684000.	joules
" " "	641.2	kilogram-calories
" " "	273700.	kilogram-meters
" " "	.7457	kilowatt-hours
inches	2.540	centimeters
"	1000.	mils
inches of mercury	.03342	atmospheres
" " "	1.133	feet of water
" " "	345.3	kgs. per square meter
" " "	70.73	pounds per square foot
" " "	.4912	pounds per square inch
inches of water	.002458	atmospheres
" " "	.07355	inches of mercury
" " "	25.40	kgs. per square meter
" " "	.5781	ounces per square inch
" " "	5.204	pounds per square foot
" " "	.03613	pounds per square inch
joules	.000948	British thermal units
"	10000000.	ergs

Conversion Factors

MULTIPLY	BY	TO OBTAIN
joules (cont'd)	.7376	foot-pounds
"	.0002390	kilogram-calories
"	.1020	kilogram-meters
"	.0002778	watt-hours
kilograms	980665.	dynes
"	1000.	grams
"	70.93	poundals
"	2.205	pounds
"	.001102	tons (short)
kilogram-calories	3.968	British thermal units
" "	3088.	foot-pounds
" "	.001558	horse-power-hours
" "	4186.	joules
" "	426.9	kilogram-meters
" "	.001162	kilowatt-hours
kilogram calories per min.	51.46	foot-pounds per sec.
" " " "	.09351	horse-power
" " " "	.06972	kilowatts
kilograms per cubic meter	.001	grams per cubic cm.
" " " "	.06243	pounds per cubic foot
" " " "	.00003613	pounds per cubic inch
" " " "	.0000000003405	pounds per mil foot
kilometers	100000.	centimeters
"	3281.	feet
"	1000.	meters
"	.6214	miles
"	1094.	yards
kilometers per hour	27.78	centimeters per second
" " "	54.68	feet per minute
" " "	.9113	feet per second
" " "	.5396	knots per hour
" " "	16.67	meters per minute
" " "	.6214	miles per hour
kilowatts	56.88	B. t. units per min.
"	44250.	foot-pounds per min.
"	737.6	foot-pounds per sec.
"	1.341	horse-power
"	14.34	kg.-calories per min.
"	1000.	watts
kilowatt-hours	3413.	British thermal units
" "	2655000.	foot-pounds
" "	1.341	horse-power-hours
" "	3600000.	joules
" "	860.5	kilogram-calories
" "	367100.	kilogram-meters
knots	6080.	feet
"	1.853	kilometers
"	1.152	miles
"	2027.	yards
knots per hour	51.48	centimeters per second
" " "	1.689	feet per second
" " "	1.853	kilometers per hour
" " "	1.152	miles per hour
links (engineer's)	12.	inches
links (surveyor's)	7.92	inches
liters	1000.	cubic centimeters

Conversion Factors

MULTIPLY	BY	TO OBTAIN
liters (cont'd)	.03531	cubic feet
"	61.02	cubic inches
"	.001	cubic meters
"	.001308	cubic yards
"	.2642	gallons
"	2.113	pints (liq.)
"	1.057	quarts (liq.)
liters per min.	.0005885	cubic feet per second
" " "	.004403	gallons per second
lumens per sq. ft.	1.	foot-candles
meters	100.	centimeters
"	3.281	feet
"	39.37	inches
"	.001	kilometers
"	1000.	millimeters
"	1.094	yards
micrograms	.000001	grams
microliters	.000001	liters
miles	160900.	centimeters
"	5280.	feet
"	1.609	kilometers
"	1760.	yards
miles per hour	44.70	centimeters per sec.
" " "	88.	feet per minute
" " "	1.467	feet per second
" " "	1.609	kilometers per hour
" " "	.8684	knots per hour
" " "	26.82	meters per minute
miles per minute	2682.	centimeters per sec.
" " "	88.	feet per second
" " "	1.609	kilometers per min.
" " "	.8684	knots per minute
" " "	60.	miles per hour
mil-feet	.000009425	cubic inches
milligrams	.001	grams
milliliters	.001	liters
millimeters	.1	centimeters
"	.03937	inches
"	39.37	mils
mils	.002540	centimeters
"	.001	inches
months	30.42	days
"	730.	hours
"	43800.	minutes
"	2628000.	seconds
myriagrams	10.	kilograms
myriameters	10.	kilometers
myriawatts	10.	kilowatts
ounces (avoir)	16.	drams
" "	437.5	grains
" "	28.35	grams
" "	.0625	pounds
ounces (fluid)	1.805	cubic inches
" "	.02957	liters
ounces (troy)	480.	grains (troy)
" "	31.10	grams

Conversion Factors

MULTIPLY	BY	TO OBTAIN
ounces (troy) (cont'd)	20.	pennyweights (troy)
" "	.08333	pounds (troy)
ounces per square inch	.0625	pounds per square inch
pints (dry)	33.60	cubic inches
pints (liq.)	28.87	cubic inches
poundals	13826.	dynes
"	14.10	grams
"	.03108	pounds
pounds (avoir)	444823.	dynes
" "	7000.	grains
" "	453.6	grams
" "	16.	ounces
" "	32.17	poundals
pounds (troy)	.8229	pounds (av.)
pound-feet	13560000.	centimeter-dynes
" "	13825.	centimeter-grams
" "	.1383	meter-kilograms
pounds of water	.01602	cubic feet
" " "	27.68	cubic inches
" " "	.1198	gallons
pounds of water per min.	.0002669	cubic feet per sec.
pounds per cubic foot	.01602	grams per cubic cm.
" " " "	16.02	kgs. per cubic meter
" " " "	.0005787	pounds per cubic inch
" " " "	.000000005456	pounds per mil foot
pounds per cubic inch	27.68	grams per cubic cm.
" " " "	27680.	kgs. per cubic meter
" " " "	1728.	pounds per cubic foot
" " " "	.000009425	pounds per mil foot
pounds per square foot	.01602	feet of water
" " " "	4.882	kgs. per square meter
" " " "	.006944	pounds per square inch
pounds per square inch	.06804	atmospheres
" " " "	2.307	feet of water
" " " "	2.036	inches of mercury
" " " "	703.1	kgs. per square meter
" " " "	144.	pounds per square foot
quarts (dry)	67.20	cubic inches
quarts (liq.)	57.75	cubic inches
radians	57.30	degrees
"	3438.	minutes
"	.637	quadrants
reams	500.	sheets
revolutions per minute	6.	degrees per second
" " "	.1047	radians per second
" " "	.01667	revolutions per sec.
rods	16.5	feet
square centimeters	197300.	circular mils
" "	.001076	square feet
" "	.1150	square inches
" "	.0001	square meters
" "	100.	square millimeters
square feet	.00002296	acres
" "	929.	square centimeters
" "	144.	square inches
" "	.09290	square meters

Conversion Factors

MULTIPLY	BY	TO OBTAIN
square feet (cont'd)	.00000003587	square miles
" "	1/9	square yards
square inches	1273000.	circular mils
" "	6.452	square centimeters
" "	.006944	square feet
" "	1000000.	square mils
" "	645.2	square millimeters
square kilometers	247.1	acres
" "	10760000.	square feet
" "	1000000.	square meters
" "	.3861	square miles
" "	1196000.	square yards
square meters	.0002471	acres
" "	10.76	square feet
" "	.0000003861	square miles
" "	1.196	square yards
square miles	640.	acres
" "	27880000.	square feet
" "	2.590	square kilometers
" "	3098000.	square yards
square millimeters	1973.	circular mils
" "	.01	square centimeters
" "	.001550	square inches
square mils	1.273	circular mils
" "	.000006452	square centimeters
" "	.000001	square inches
square yards	.0002066	acres
" "	9.	square feet
" "	.8361	square meters
" "	.0000003228	square miles
tons (long)	1016.	kilograms
" "	2240.	pounds
tons (metric)	1000.	kilograms
" "	2205.	pounds (avoir)
tons (short)	907.2	kilograms
" "	2000.	pounds
tons (short) per sq. ft.	9765.	kgs. per square meter
" " " " "	13.89	pounds per square inch
tons (short) per sq. in.	1406000.	kgs. per square meter
" " " " "	2000.	pounds per square inch
watts	.05688	B. t. units per min.
"	10000000.	ergs per second
"	44.26	foot-pounds per min.
"	.7376	foot-pounds per sec.
"	.001341	horse-power
"	.01434	kg.-calories per min.
"	.001	kilowatts
watt-hours	3.413	British thermal units
" "	2655.	foot-pounds
" "	.001341	horse-power-hours
" "	.86	kilogram-calories
" "	367.1	kilogram-meters
" "	.001	kilowatt-hours
yards	91.44	centimeters
"	3.	feet
"	36.	inches
"	.9144	meters

Board Feet

Number of Feet, Board Measure, per Linear Foot, for Various Widths and Thicknesses

Width of Board Inches	Thickness of Board, Inches														
	1	1½	2	2½	3	3½	4	5	6	7	8	9	10	12	14
3	0.250	0.375	0.500	0.625	0.750	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3½	.292	.438	.583	.729	.875	1.021	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	.333	.500	.667	.833	1.000	1.167	1.333	.....	.....	.....	.....	.....	.....	.....	.....
4½	.375	.563	.750	.938	1.125	1.313	1.500	.....	.....	.....	.....	.....	.....	.....	.....
5	.417	.625	.833	1.042	1.250	1.457	1.666	2 083	.....	.....	.....	.....	.....	.....	.....
6	.500	.750	1.000	1.250	1.500	1.750	2.000	2.500	3.000	.....	.....	.....	.....	.....	.....
7	.583	.875	1.167	1.458	1.750	2.042	2.333	2.917	3.500	4.083	.....	.....	.....	.....	.....
8	.667	1.000	1.333	1.667	2.000	2.333	2.667	3.333	4.000	4.667	5.333	.....	.....	.....	.....
9	.750	1.125	1.500	1.875	2.250	2.625	3.000	3.750	4.500	5.250	6.000	6.750	.....	.....	.....
10	.833	1.250	1.667	2.083	2.500	2.917	3.333	4.167	5.000	5.833	6.667	7.500	8.333	.....	.....
11	.917	1.375	1.833	2.292	2.750	3.208	3.667	4.583	5.500	6.417	7.333	8.250	9.167	11.000	12.833
12	1.000	1.500	2.000	2.500	3.000	3.500	4.000	5.000	6.000	7.000	8.000	9.000	10.000	12.000	14.000
13	1.083	1.625	2.167	2.708	3.250	3.792	4.333	5.417	6.500	7.583	8.667	9.750	10.833	13.000	15.167
14	1.167	1.750	2.333	2.917	3.500	4.083	4.667	5.833	7.000	8.167	9.333	10.500	11.667	14.000	16.333
15	1.250	1.875	2.500	3.125	3.750	4.375	5.000	6.250	7.500	8.750	10.000	11.250	12.500	15.000	17.500
16	1.333	2.000	2.667	3.333	4.000	4.667	5.333	6.667	8.000	9.333	10.667	12.000	13.333	16.000	18.667
18	1.500	2.250	3.000	3.750	4.500	5.250	6.000	7.500	9.000	10.500	12.000	13.500	15.000	18.000	21.000
20	1.667	2.500	3.333	4.167	5.000	5.833	6.667	8.333	10.000	11.667	13.333	15.000	16.667	20.000	23.333
22	1.833	2.750	3.667	4.583	5.500	6.417	7.333	9.167	11.000	12.833	14.667	16.500	18.333	22.000	25.667
24	2.000	3.000	4.000	5.000	6.000	7.000	8.000	10.000	12.000	14.000	16.000	18.000	20.000	24.000	28.000
26	2.167	3.250	4.333	5.417	6.500	7.583	8.667	10.833	13.000	15.167	17.333	19.500	21.667	26.000	30.333
28	2.333	3.500	4.667	5.833	7.000	8.167	9.333	11.667	14.000	16.333	18.667	21.000	23.333	28.000	32.667
30	2.500	3.750	5.000	6.250	7.500	8.750	10.000	12.500	15.000	17.500	20.000	22.500	25.000	30.000	35.000
32	2.667	4.000	5.333	6.667	8.000	9.333	10.667	13.333	16.000	18.667	21.333	24.000	26.667	32.000	37.333
34	2.833	4.250	5.667	7.083	8.500	9.917	11.333	14.167	17.000	19.833	22.667	25.500	28.333	34.000	39.667
36	3.000	4.500	6.000	7.500	9.000	10.500	12.000	15.000	18.000	21.000	24.000	27.000	30.000	36.000	42.000

Private Code

Use this private code and code names after each article listed, when possible, as it will save cost, time and avoid possible errors.

Quotations

Code Name	
Untol	Quote price f. o. b. cars, Portland.
Untra	Quote f. a. s. steamer, Portland.
Untun	Quote price including freight.
Unuse	Quote best price on .....
Unuto	Quote price shipping weight and time of delivery on.....
Unvan	Quotation satisfactory; ship soon as possible.
Unvei	Quote price for services of tankman.
Unvis	Price can be reduced if specifications are revised.
Unwar	Prices are subject to a discount of.....per cent.
Unwea	Prices are subject to our regular discount.
Unwho	Prices are net cost to you.
Unwil	We are unable to modify our quotation.
Unwon	If quotation is satisfactory wire at our expense.
Unwri	To enable you to secure order will make following special price.
Unyie	We will make you the following special terms.
Unyok	We have arranged for payment on presentation of bill of lading in.....
Upbea	Goods will cost f. o. b. cars Portland.....dollars.
Upbra	Goods will cost f. o. b. cars your nearest R. R. station.....dollars.
Uphea	Cost, insurance, freight exclusive of import duties and excises.
Uphol	Freight and import duties included.
Uplan	How much will goods cost f. o. b. cars, Portland?
Uprig	How much will goods cost f. o. b. cars our nearest R. R. station?

Delivery

Uproa	How soon can you ship?
Upsho	When will you ship?
Upsid	Can you ship immediately?
Upsta	Ship as soon as possible.
Uptur	Ship via.....
Upwar	Send tracer after.....
Urani	Telegraph very quickest possible delivery of.....
Urban	Name the lowest carload rate you can get to.....
Urchi	Ship in carload with.....
Urgen	Can ship on steamer....., leaving .....on.....
Ursif	Can ship within six days from receipt of order.
Ursul	Can ship within ten days from receipt of order.
Usefu	Can ship within two weeks from receipt of order.
Usele	Can ship within four weeks from receipt of order.
Usher	Can ship within one month from receipt of order.
Usufr	Can ship within two months from receipt of order.
Usuri	Can commence delivery within six days.
Utens	Can commence delivery within ten days.
Utili	Can ship first car within ten days; balance one car per week.

Packing

Utmos	Pack for export with gross and net weight of each package.
Utopi	Pack for wagon haul.
Utric	Pack for mule-back transportation.
Uterl	Shall we pack for export transportation?
Uveou	Shall we pack for mule-back?
Uxori	Goods are packed ready for shipment.
Vacan	Packing instructions will follow.

Private Code

Shipment

Code Name	
Vacil	Ship by freight.
Vagar	Ship by express.
Vaing	Ship by steamer.
Valan	Ship as minimum carload.
Valef	Ship as less than carload.
Valia	Ship freight collect.
Valua	Ship freight prepaid.
Valvu	We will ship not later than.....
Vampi	Your order was shipped on.....
Vanda	We expect to ship in.....
Vandy	We will ship immediately.
Vangu	Forward shipping directions for.....
Vanis	Weight will be about.....pounds.
Vanta	We are ready to ship.
Vapid	They will not be ready to ship until .....
Varia	Our shipment is less than carload. Have you anything to fill car?

Terms

Varle	——— Per cent cash 30 days.
Varni	——— Per cent cash 10 days.
Vascu	Net cash on receipt of goods.
Vasta	Net cash on receipt of invoice and shipping papers.
Vatic	One-third cash with order; balance when ready to ship.
Vecto	Cash with order.

Miscellaneous

Vedet	What is the nearest size in stock?
Veget	Order depends upon prompt delivery.
Vehem	We are figuring with.....
Vehic	We have sent tracer after.....
Veine	Nothing of approximate size in stock.
Veloc	Will send particulars by mail.
Velve	Please refer to our letter dated.....
Venar	Please refer to our telegram dated.....
Vende	See our descriptive circular for desired information.
Vener	For desired information see our catalog No. 37, page .....
Venge	Mail particulars regarding.....
Venia	We do not understand what you mean by.....
Venth	Have not yet received formal order for.....
Venti	Shall we go ahead with your order?

Outside Diameter of Tanks

Code Name		Code Name		Code Name		Code Name	
Verac	1′	Vilen	11½′	Vivor	22′	Vulga	32½′
Verba	1½′	Vilif	12′	Vivif	22½′	Vulne	33′
Verda	2′	Vinac	12½′	Vizie	23′	Vultu	33½′
Verif	2½′	Vinci	13′	Vocab	23½′	Wable	34′
Vermi	3′	Vindi	13½′	Vocal	24′	Wadan	34½′
Verna	3½′	Viner	14′	Vocif	24½′	Wadin	35′
Versa	4′	Vinta	14½′	Voguf	25′	Wafel	35½′
Vesic	4½′	Violo	15′	Voidl	25½′	Waftn	36′
Vespe	5′	Virag	15½′	Volat	26′	Wagen	36½′
Vesta	5½′	Virid	16′	Volca	26½′	Wager	37′
Veter	6′	Virto	16½′	Volit	27′	Wagis	37½′
Vexat	6½′	Visag	17′	Volub	27½′	Wagle	38′
Visab	7′	Visco	17½′	Volum	28′	Waift	38½′
Veame	7½′	Visib	18′	Vorac	28½′	Wailf	39′
Vibra	8′	Visio	18½′	Vorag	29′	Wains	39½′
Vicec	8½′	Visor	19′	Vorti	29½′	Waist	40′
Vicin	9′	Vitia	19½′	Votar	30′	Waitn	45′
Videl	9½′	Vitre	20′	Votiv	30½′	Wairf	50′
Vidua	10′	Vitul	20½′	Vouct	31′	Wakeb	60′
Viewl	10½′	Vitup	21′	Voyag	31½′	Wakef	70′
Vigil	11′	Vivac	21½′	Vulca	32′		

Private Code

Outside Length of Staves

Code Name		Code Name		Code Name	
Wakin....	1′	Wampu..	4½′	Warlf.....	12′
Walef.....	1½′	Wande...	5′	Warbl....	14′
Walko....	2′	Wanel....	6′	Warbm...	16′
Wallp....	2½′	Wanne...	7′	Wardro...	18′
Walnu....	3′	Wantf....	8′	Wareh....	20′
Walru....	3½′	Wanti....	9′	Warfl.....	22′
Waltz....	4′	Wanto....10′		Waril.....	24′

Code Name		Code Name	
Warin....	Staves made of 2″ Redwood.	Warmi...	Staves made of 2″ Douglas Fir.
Warmf...	" " " 3″ "	Warmt...	" " " 3″ " "
		Warni....	" " " 4″ " "
		Warpf....	" " " 6″ " "

Warra....Staves made straight without taper.
Wartp....Staves made with regular taper.
Warty....Staves made with patent channel in top.
Waryl....Staves made with groove in edge.

Code Name		Code Name	
Washa....	Staves made with 2½″ chine.	Wasea....	Staves made with 4″ chine.
Washf....	" " " 3 ″ "	Wasta....	" " " 5″ "
Waspb...	" " " 3½″ "	Wastf....	" " " 6″ "

Watch....Bottom to be constructed of 2″ Redwood.
Watar.... " " " " " 3″ "
Waten.... " " " " " 2″ Douglas Fir.
Wattl.... " " " " " 3″ " "
Waule.... " " " " " 4″ " "
Waufl.... " " " " " 6″ " "

Wautm...Entire tank to be constructed of 2″ Redwood.
Wavel.... " " " " " " 3″ "
Wavof.... " " " " " " 2″ Douglas Fir.
Wavml... " " " " " " 3″ " "
Wavya... " " " " " " 4″ " "
Waxwo... " " " " " " 6″ " "

Code Name	
Wayfa....	Hoops made of ½″ round steel.
Wayla....	" " " ⅝″ " "
Waywa...	" " " ¾″ " "
Wealf.....	" " " ⅞″ " "
Weaka....	" " " 1″ " "

Weakb...All hoops fitted with lugs.
Weakz....No hoops wanted.
Wealf.....Specify hoops to be used.

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C. P. Morris — 15

Cocoa Cola — 10

First Natl Bk — 6.76

Astoria

Fredricks Cas — 25.

Brookfield Co. — 25.

81.76

L. R. — 10.

91.76

510
255
7.65

Rent. 30 20 20 20 15 = 105

Store 75.

Wages 200

380

250

3 7,50

500

460
120
9200
46
800

3.83
2
7.50

46
5
230
120
6
600

Im House
25.
20.
20.
20
15
120.

46
1½
9
46
55